Report 11231
September 1998

Integrated Advanced Microwave Sounding Unit-A (AMSU-A)

Performance Verification Report

METSAT AMSU-A1 Receiver Assembly

P/Ns 1356409-1 & 1356429-1, S/N 105

Contract No. NAS 5-32314
CDRL 208

Submitted to:

National Aeronautics and Space Administration
Goddard Space Flight Center
Greenbelt, Maryland 20771

Submitted by:

Aerojet
1100 West Hollyvale Street
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Report 11231
September 1998

PERFORMANCE VERICATION TEST REPORT
EOS AMSU-A1 RECEIVER ASSEMBLIES
FOR
INTEGRATED ADVANCED MICROWAVE SOUNDING UNIT-A
(AMSU-A)

CONTRACT NO. NAS5-32314
CDRL PAR 3.3.2.1

SEPTEMBER 1998

SUBMITTED TO

NATIONAL AERONAUTICS AND SPACE ADMINISTERATION
GODDARD SPACE FLIGHT CENTER
GREENBELT, MARYLAND 20771

SUBMITTED BY

AEROJET ELECTRONIC SYSTEMS PLANT
1100 WST HOLLYVALE STREET
AZUSA, CALIFORNIA 91702

AMSU-A RECEIVER VERIFICATION TEST REPORT

LEVEL OF ASSEMBLY:	**SUBASSEMBLY**
TEST ITEM:	**AMSU-A1 RECEIVER ASSEMBLY** **P/N: 1356429-1, S/N: F02** **P/N: 1356409-1, S/N: F02**
TYPE OF HARDWARE:	**METSAT FLIGHT MODEL (FM)**
TYPE OF TEST:	**FUNCTIONAL PERFORMANCE**
VERIFICATION TEST PROCEDURE:	**AE-26002/6A**
TEST FACILITY LOCATION:	**AESP** **AZUSA, CALIFORNIA**

SIGNATURE:

TEST ENGINEER: _____ **DATE:** _____

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1.0 INTRODUCTION

The AMSU-A receiver subsystem comprises two separated receiver assemblies; AMSU-A1 and AMSU-A2 (P/N 1356441-1). The AMSU-A1 receiver contains 13 channels and the AMSU-A2 receiver 2 channels. The AMSU-A1 receiver assembly is further divided into two parts; AMSU-A1-1 (P/N 1356429-1) and AMSU-A1-2 (P/N 1356409-1), which contain 9 and 4 channels, respectively. Figures 1 and 2 illustrate the functional block diagrams of the AMSU-A1 and AMSU-A2 receivers.

The AMSU-A receiver subsystem stands in between the antenna and signal processing subsystems of the AMSU-A instrument and comprises the RF and IF components from isolators to attenuators as shown in Figures 1 and 2. It receives the RF signals from the antenna subsystem, down-converts the RF signals to IF signals, amplifies and defines the IF signals to proper power level and frequency bandwidth as specified for each channel, and inputs the IF signals to the signal processing subsystem.

The test reports for the METSAT AMSU-A receiver subsystem are prepared separately for A1 and A2 receivers so that each receiver stands alone during integration of instruments into the spacecraft. This test report presents the test data of the METSAT AMSU-A1 Flight Model No. 2 (FM-2) receiver subsystem. The tests are performed per the Acceptance Test Procedure (ATP) for the AMSU-A Receiver Subsystem, AE-26002/6A. The functional performance tests are conducted either at the component or subsystem level. While the component-level tests are performed over the entire operating temperature range predicted by thermal analysis, the subsystem-level tests are conducted at ambient temperature only.

2.0 REASON FOR TEST

The ATP for the AMSU-A Receiver Subsystem, AE-26002/6A, is prepared to describe in detail the configuration of the test setups and how the tests are to be conducted to verify that the receiver subsystem meets the specifications as required either in the AMSU-A Instrument Performance and Operation Specification, S-480-80, or in AMSU-A Receiver Subsystem Specification, AE-26608, derived by the Aerojet System Engineering. Test results that verify the conformance to the specifications demonstrates the acceptability of that particular receiver subsystem.

3.0 ACCEPTANCE TEST

The acceptance tests for the AMSU-A receiver subsystem are performed either at the component or subsystem level. The component-level tests are conducted per the Acceptance Test Procedure of each component at supplier's facilities. The subsystem-level tests are conducted per the ATP, AE-26002/6A at Aerojet Azusa facility.

The component-level tests include the center frequency, center frequency stability, bandpass characteristics, gain stability, and gain compression. Although the bandpass characteristics can change slightly in subsystem level, these performance are mainly dependent on the component characteristics. The subsystem-level tests include the center frequency, IF output power, bandpass characteristics, noise figure, noise power stability, and the tunable short test.

The subsystem-level tests are performed on AMSU-A1 receivers; AMSU-A1-1and AMSU-A1-2. However, since the multiplexers of the AMSU-A1 system are inseparably integrated to the receivers, the acceptance tests are conducted with the feedhorns directly connected to respective multiplexers that precede the receiver subsystem. These tests are performed at room ambient temperature only.

Wire connections between the D-sub connectors and platinum resistance temperature (PRT) sensors and thermistors, D-sub connector and PLO lock detection terminals, and D-sub connector and survival heaters through the thermal switches are verified by measuring either the resistance between the respective two pins or the voltage across the respective two pins. The component bias voltages are verified by measuring the voltages across the two respective banana jacks of the breakout box that are connected to corresponding pins of the D-sub connector.

The acceptance tests for the METSAT AMSU-A1 receiver subsystem began with the AMSU-A1-2 receiver. The tests went smoothly verifying that the A1-2 receiver met all specified performance requirements. Two PRT failures (opened RT 19 and shorted RT 22) and a cross-wiring were revealed during the tests. The two PRTs were replaced and the cross-wiring was corrected. The cross-wiring had no impact on the receiver as the two wires connected to the same +10V supplies. These issues are addressed in F/AR No. 134. A spurious noise was observed in the channel 4 passband of this receiver during the system integration tests (F/AR No. 141). The noise was reduced to acceptable level by wrapping a wire mesh around the joint of the mixer/IF amplifier, but the components on this channel had to be disassembled from and reassembled to the receiver shelve. The functional performances of this channel were verified again and the test data were added to this test report.

During the acceptance tests for the A1-1 receiver, a lower voltage (+11V) than the specified (+14V minimum) was measured for the PLO lock detection as addressed in F/AR No. 140. The cause of this anomaly was traced to a capacitor (C8) of the PLO circuit which was damaged by reverse biasing. After reviewing the circuit, a design change was implemented eliminating the capacitor from the PLO circuit for the METSAT AMSU-A1 receivers. The acceptance tests for the A1-1 receiver were continued and all but one specified performance requirements were met with adequate margins. A higher noise stability of 0.15K was measured against the specification of 0.08K for the channel 6. The measured noise figure was marginal at 5.08dB. The bandpass characteristics of this channel exhibited a peak (approximately 2dB) at the lower end of the passband. The noise stability was reduced to an acceptable level (0.04K) with much improved noise

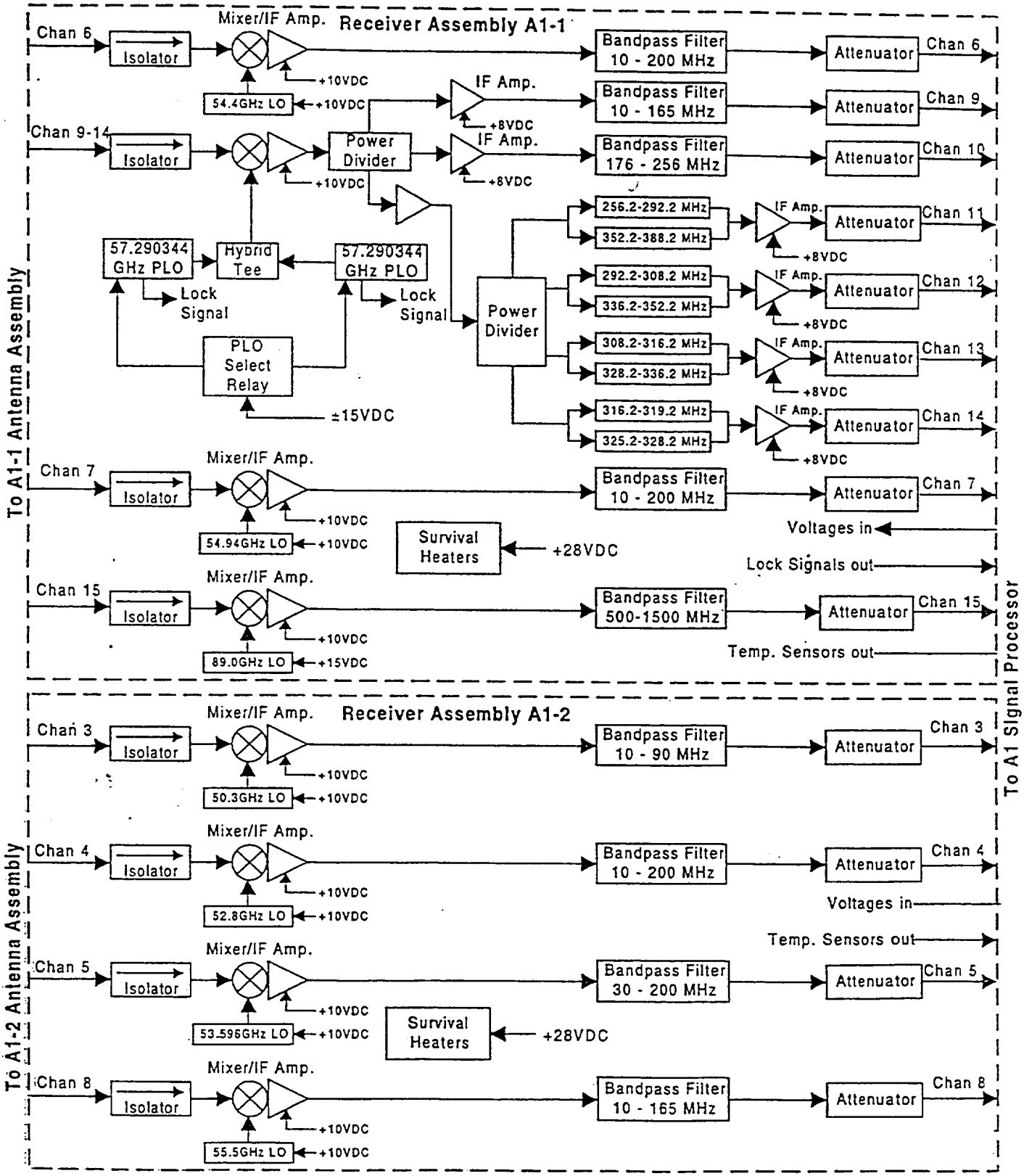

Figure 1. AMSU-A1 Receiver Functional Block Diagram

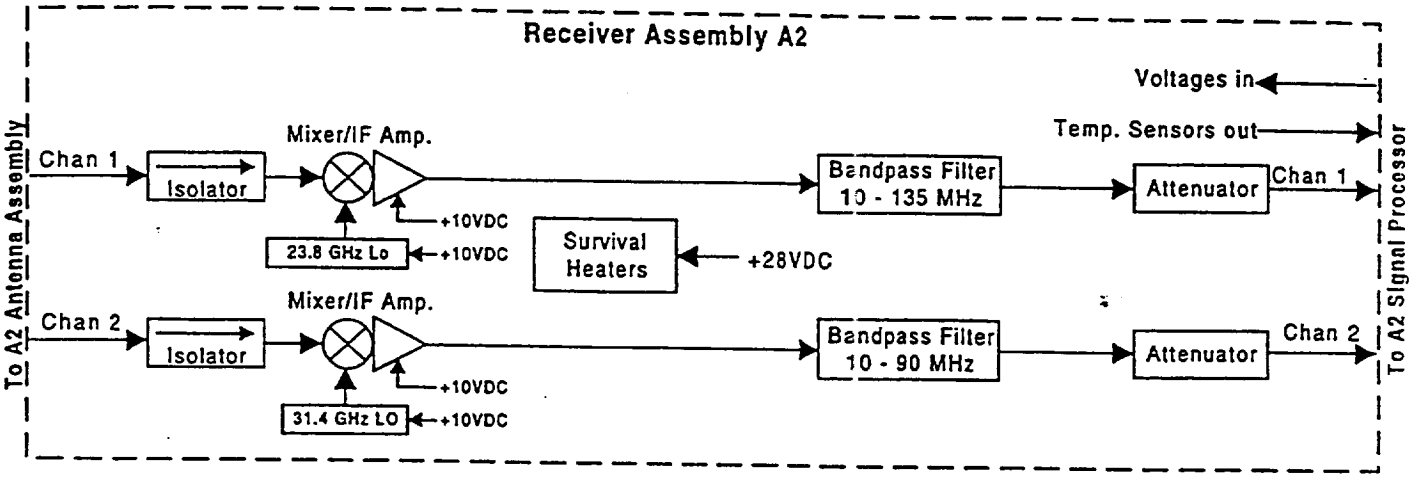

Figure 2. AMSU-A2 Receiver Functional Block Diagram

figure (4.09dB) and bandpass characteristics by lowering the LO power level from nominal +10dBm to +6dBm. The performances of this channel were verified by measuring the bandpass characteristics and noise figure over the operating temperature. This issue was addressed in F/AR No. 140.

4.0 ORGANIZATION OF TEST DATA

The test data are organized in the following formats. The test data obtained at the component level are first summarized for each category for all applicable receiver channels. The bandpass characteristics of the filters are summarized only for the data measured at mid-temperature. Supporting component test data over the operating temperature range then follows the summaries.

The subsystem-level test data are organized for each receiver (A1-1 andA1-2), but not in the order of tests. Test data recorded in the test sheet as prepared in the ATP and related data plots are included in this test report.

5.0 SUMMARY AND RECOMMENDATIONS

The METSAT AMSU-A1 FM-2 receiver subsystem successfully passed all performance requirements and is delivered to the System Engineering for system integration and test. The test data, in most cases, indicated adequate margins for key performance specifications. Tunable short test was not performed on this receiver subsystem and will instead be conducted on a later unit.

During the acceptance tests for the A1-1 receiver, a lower voltage was measured for the PLO lock detection. This anomaly was traced to a capacitor (C8) in the PLO circuit that was damaged by reverse biasing. Ensuing review of the circuit has resulted in a design change that eliminated the capacitor. This design change is to be implemented into the PLO circuit fort all METSAT AMSU-A1eceivers. We have encountered a higher noise stability (0.15K) than the specified (0.08K) for the channel 6 of the A1-1 receiver. The noise stability of the same mixer/IF amplifier was 0.052K at the component-level tests when measured at the nominal +10 dBm LO power level. The noise figure of this channel was also higher than the expected. Although the noise stability was reduced to an acceptable level with improved noise figure by lowering the LO power level (to +6dBm), the cause of this anomaly is not clear at this time. We suspect that this anomaly is due to different impedance matching at the RF and LO ports of the mixer. Sufficient trouble-shooting/cause analyses could not be made on this flight hardware but further investigations are required to prevent similar anomalies from occurring on future receiver subsystems.

6.0 TEST DATA

In the following, the component and subsystem-level test data are organized as delineated in Paragraph 4.0.

COMPONENT-LEVEL TEST DATA

CENTER FREQUENCY AND FREQUENCY STABILITY

FOR

LOCAL OSCILLATORS (LOs)
(DROs, PLOs, & GDO)

CENTER FREQUENCY OF LOs

Channel No.	3	4	5	6	7	8	9-14 *	15
Specification (GHz)	50.3	52.8	53.596	54.4	54.94	55.5	57.290344	89.0
Setting Accuracy (+/-GHz)	0.002	0.001	0.001	0.001	0.001	0.002	0.000086	0.03
Measured (GHz)	50.30063	52.80000	53.59679	54.39986	54.94068	55.50036	57.290340 57.290335	89.000

* Measured for PLO No. 1 and No. 2.

FREQUENCY STABILITY OF LOs

Channel No.	3	4	5	6	7	8	9-14 *	15
Short-Term Specification (+/-MHz)	8	3	3	3	3	6	0.086	80
Setting Accuracy (+/-MHz)	2	1	1	1	1	2		30
W/ Temp. & Voltage (+/-MHz)	6	2	2	2	2	6		50
Measured (MHz) Total	+1.23, -0.52	+0.77 -1.89	+0.64, 0.38	+0.17, -0.62	+0.85, -1.31	+1.27, -1.87	+0.020, -0.028 +0.020, -0.024	+10., -10.
Long-Term Specification (+/-MHz)	2	2	2	2	2	2	0.114	50
By Design or Analysis ** (+/-MHz)	0.1	0.1	0.1	0.1	0.1	0.1	0.115	76

* Measured for PLO No. 1 and No. 2.

** Based on accelerated life-test data for DROs.

Channel 3 LO

DRO (P/N: 1336610-3, S/N: 85092)

LITTON
Solid State

TEST DATA SHEET 7.2
FUNCTIONAL PERFORMANCE TESTS
INITIAL DATA SET N/A FINAL DATA SET ✓

LITTON TYPE LS E9036 AM AESD 1336610- 3
SERIAL NUMBER: 85092 QUAL TEST ✓ ACCEPT TEST N/A

Basic Electrical Test; Ref. Test Para. 5.2.2

SPECIFICATION	MEASUREMENT AT Tnom ±1°C	LIMIT
Measurement at Vop=10 VDC		
Temperature	22 °C	Table IIIB
Input Voltage	10 VDC	10.0 ± 0.2 VDC
Input Current	179 mA	Table IIIB
Input Power, P_{diss}	1.79 W DC	P_{diss} max
Frequency, f_{Tnom}	50.30063 GHz	Table IIIB
RF Output Power, P_{Tnom}	13.5 dBm	12 to 17 dBm
Frequency Setting Accuracy, Δf_S (= f_{Tnom}-F_o)	0.63 MHz	

Frequency and RF Output Power Variation With Voltage, Ref. Test Para 5.2.3

Measurement at 9.5 VDC or at 9.5 VDC		
Temperature	22 °C	Table IIIB
Input Voltage	9.5 VDC	9.5 VDC or Para. 5.2.3.2
Input Current	177 mA	Table IIIB
Frequency, f_{meas}	50.30063 GHz	Table IIIB
RF Output Power, P_{meas}	13.5 dBm	12 to 17 dBm
Measurement at 10.5 VDC or at 10.5 VDC		
Temperature	22 °C	Table IIIB
Input Voltage	10.5 VDC	10.5 VDC or Para. 5.2.3.3
Input Current	178 mA	Table IIIB
Frequency, f_{meas}	50.30063 GHz	Table IIIB
RF Output Power, P_{meas}	13.5 dBm	12 to 17 dBm

Calculate Frequency Variation, $\Delta f_V = f_{meas} - f_{Tnom}$,

Δf_V at 9.5 VDC or at 9.5 VDC = 0 MHz
Δf_V at 10.5 VDC or at 10.5 VDC = 0 MHz

Calculate RF Output Power Variation, $\Delta P_V = P_{meas} - P_{Tnom}$,

ΔP_V at 9.5 VDC or at 9.5 VDC = 0 dB
ΔP_V at 10.5 VDC or at 10.5 VDC = 0 dB

Accept ✓ Reject

Test Performed by [illegible] Date 5-15-98
Litton QA LITTON [illegible] Date MAY 2 8 1998

CODE IDENT NO.	SIZE	NUMBER	REV	SHEET 38 OF 68
56348	A	1300823	B3	

TEST DATA SHEET 7.3
FUNCTIONAL PERFORMANCE TESTS
INITIAL DATA SET N/A FINAL DATA SET ✓

LITTON TYPE LS E 9036 AM AESD 1336610- 3
SERIAL NUMBER: 85092 QUAL TEST ✓ ACCEPT TEST N/A

Temperature Testing at T=10°C. Ref. Test Para. 5.2.5.1

SPECIFICATION	MEASUREMENT AT T=10° ±1°C		LIMIT
Measurement at Vop=10 VDC			
Temperature	10	°C	10° ± 1°C
Input Voltage	10	VDC	10.0 ± 0.2 VDC
Input Current	181	mA	Table IIIB
Input Power, P_{diss}	1.81	W DC	Pdiss max
Frequency, $f_{10°C}$	50.30032	GHz	Table IIIB
RF Output Power, $P_{10°C}$	13.5	dBm	12 to 17 dBm

Frequency and RF Output Power Variation With Voltage, Ref. Test Para 5.2.5.1

Measurement at 9.5 VDC or at 9.5 VDC			
Temperature	10	°C	Table IIIB
Input Voltage	9.5	VDC	9.5 VDC or Para. 5.2.3.2
Input Current	178	mA	Table IIIB
Frequency, f_{meas}	50.30032	GHz	Table IIIB
RF Output Power, P_{meas}	13.5	dBm	12 to 17 dBm
Measurement at 10.5 VDC or at 10.5 VDC			
Temperature	10	°C	Table IIIB
Input Voltage	10.5	VDC	10.5 VDC or Para. 5.2.3.3
Input Current	179	mA	Table IIIB
Frequency, f_{meas}	50.30032	GHz	Table IIIB
RF Output Power, P_{meas}	13.5	dBm	12 to 17 dBm

Calculate Frequency Variation. $\Delta f_V = f_{meas} - f_{10°C}$:

Δf_V at 9.5 VDC or at 9.5	VDC =	0	MHz
Δf_V at 10.5 VDC or at 10.5	VDC =	0	MHz
Δf_T at 10.0 VDC (=$f_{10°C} - f_{Tnom}$)	=	-0.31	MHz

Calculate RF Output Power Variation. $\Delta P_V = P_{meas} - P_{10°C}$:

ΔP_V at 9.5 VDC or at 9.5	VDC =	0	dB
ΔP_V at 10.5 VDC or at 10.5	VDC =	0	dB
ΔP_T at 10.0 VDC (=$P_{10°C} - P_{Tnom}$)	=	0	dB

Accept ✓ Reject _____

Test Performed by DM Date 5-15-98
Litton Q.A. LITTON Date MAY 26 1998

TEST DATA SHEET 7.4
FUNCTIONAL PERFORMANCE TESTS
INITIAL DATA SET N/A FINAL DATA SET ✓

LITTON TYPE LSE 9036 AM AESD 1336610- 3
SERIAL NUMBER: 85092 QUAL TEST ✓ ACCEPT TEST N/A

Temperature Extreme Testing at Tmin, Ref. Test Para. 5.2.5.2

SPECIFICATION	MEASUREMENT AT Tmin ±1°C		LIMIT
Measurement at Vop=10 VDC			
Temperature	0	°C	Table IIIB
Input Voltage	10	VDC	10.0 ± 0.2 VDC
Input Current	184	mA	Table IIIB
Input Power, P_{diss}	1.84	W DC	Pdiss max
Frequency, f_{Tmin}	50.30050	GHz	Table IIIB
RF Output Power, P_{Tmin}	13.5	dBm	12 to 17 dBm

Frequency and RF Output Power Variation With Voltage, Ref. Test Para 5.2.5.2

Measurement at 9.5 VDC or at 9.5 VDC			
Temperature	0	°C	Table IIIB
Input Voltage	10	VDC	9.5 VDC or Para 5.2.3.2
Input Current	182	mA	Table IIIB
Frequency, f_{meas}	50.30051	GHz	Table IIIB
RF Output Power, P_{meas}	13.5	dBm	12 to 17 dBm

Measurement at 10.5 VDC or at 10.5 VDC			
Temperature	0	°C	Table IIIB
Input Voltage	10.5	VDC	10.5 VDC or Para 5.2.3.3
Input Current	183	mA	Table IIIB
Frequency, f_{meas}	50.30051	GHz	Table IIIB
RF Output Power, P_{meas}	13.5	dBm	12 to 17 dBm

Calculate Frequency Variation, $\Delta f_V = f_{meas} - f_{Tmin}$:

Δf_V at 9.5 VDC or at 9.5	VDC =	0.01	MHz
Δf_V at 10.5 VDC or at 10.5	VDC =	0.01	MHz
Δf_T at 10.0 VDC (=f_{Tmin} -f_{Tnom})		-0.13	MHz

Calculate RF Output Power Variation, $\Delta P_V = P_{meas} - P_{Tmin}$:

ΔP_V at 9.5 VDC or at 9.5	VDC =	0	dB
ΔP_V at 10.5 VDC or at 10.5	VDC =	0	dB
ΔP_T at 10.0 VDC (=P_{Tmin} -P_{Tnom})	=	0	dB

Accept ✓ Reject

Test Performed by [signature] Date 5-15-98
Litton Q.A. [signature] Date MAY 26 1998

LITTON
Solid State

TEST DATA SHEET 7.5
FUNCTIONAL PERFORMANCE TESTS
INITIAL DATA SET N/A FINAL DATA SET ✓

LITTON TYPE LS E 9036 AM AESD 1336610- 3
SERIAL NUMBER: 85092 QUAL TEST ✓ ACCEPT TEST N/A

Temperature Testing at T=30°C, Ref. Test Para. 5.2.5.3

SPECIFICATION	MEASUREMENT AT T=30° ±1°C		LIMIT
Measurement at Vop=10 VDC			
Temperature	30	°C	30° ± 1°C
Input Voltage	10	VDC	10.0 ± 0.2 VDC
Input Current	178	mA	Table IIIB
Input Power, P_{diss}	1.78	W DC	Pdiss max
Frequency, $f_{30°C}$	50.30091	GHz	Table IIIB
RF Output Power, $P_{30°C}$	13.4	dBm	12 to 17 dBm

Frequency and RF Output Power Variation With Voltage, Ref. Test Para 5.2.5.3

Measurement at 9.5 VDC or at 9.5 VDC			
Temperature	30	°C	Table IIIB
Input Voltage	9.5	VDC	9.5 VDC or Para. 5.2.3.2
Input Current	175	mA	Table IIIB
Frequency, f_{meas}	50.30092	GHz	Table IIIB
RF Output Power, P_{meas}	13.4	dBm	12 to 17 dBm
Measurement at 10.5 VDC or at 10.5 VDC			
Temperature	30	°C	Table IIIB
Input Voltage	10.5	VDC	10.5 VDC or Para. 5.2.3.3
Input Current	176	mA	Table IIIB
Frequency, f_{meas}	50.30092	GHz	Table IIIB
RF Output Power, P_{meas}	13.4	dBm	12 to 17 dBm

Calculate Frequency Variation, $\Delta f_V = f_{meas} - f_{30°C}$:

Δf_V at 9.5 VDC or at 9.5	VDC =	0.01	MHz
Δf_V at 10.5 VDC or at 10.5	VDC =	0.01	MHz
Δf_T at 10.0 VDC (=$f_{30°C} - f_{Tnom}$)	=	0.28	MHz

Calculate RF Output Power Variation, $\Delta P_V = P_{meas} - P_{30°C}$:

ΔP_V at 9.5 VDC or at 9.5	VDC =	0	dB
ΔP_V at 10.5 VDC or at 10.5	VDC =	0	dB
ΔP_T at 10.0 VDC (=$P_{30°C} - P_{Tnom}$)	=	-0.1	dB

Accept ✓ Reject _____

Test Performed by [signature] Date 5-15-98
Litton Q.A. [signature] Date MAY 26 998

CODE IDENT NO.	SIZE	NUMBER	REV	SHEET 41 OF 68
56348	A	1300823	B3	

LITTON
Solid State

TEST DATA SHEET 7.6
FUNCTIONAL PERFORMANCE TESTS
INITIAL DATA SET N/A FINAL DATA SET ✓

LITTON TYPE LS E 9036 AM AESD 1336610- 3
SERIAL NUMBER: 85092 QUAL TEST ✓ ACCEPT TEST N/A

Temperature Extreme Testing at Tmax, Ref. Test Para. 5.2.5.4

SPECIFICATION	MEASUREMENT AT Tmax ±1°C		LIMIT
Measurement at Vop=10 VDC			
Temperature	43	°C	Table IIIB
Input Voltage	10	VDC	10.0 ± 0.2 VDC
Input Current	175	mA	Table IIIB
Input Power, P_{diss}	1.75	W DC	Pdiss max
Frequency, f_{Tmax}	50.30152	GHz	Table IIIB
RF Output Power, P_{Tmax}	13.2	dBm	12 to 17 dBm

Frequency and RF Output Power Variation With Voltage, Ref. Test Para 5.2.5.4

Measurement at 9.5 VDC or at 9.5 VDC			
Temperature	43	°C	Table IIIB
Input Voltage	9.5	VDC	9.5 VDC or Para 5.2.3.2
Input Current	173	mA	Table IIIB
Frequency, f_{meas}	50.30152	GHz	Table IIIB
RF Output Power, P_{meas}	13.2	dBm	12 to 17 dBm
Measurement at 10.5 VDC or at 10.5 VDC			
Temperature	43	°C	Table IIIB
Input Voltage	10.5	VDC	10.5 VDC or Para 5.2.3.3
Input Current	173	mA	Table IIIB
Frequency, f_{meas}	50.30153	GHz	Table IIIB
RF Output Power, P_{meas}	13.2	dBm	12 to 17 dBm

Calculate Frequency Variation, $\Delta f_V = f_{meas} - f_{Tmax}$:

Δf_V at 9.5 VDC or at 9.5	VDC =	0	MHz
Δf_V at 10.5 VDC or at 10.5	VDC =	0.01	MHz
Δf_T at 10.0V (=f_{Tmax} -f_{Tnom})	=	-0.11	MHz

Calculate RF Output Power Variation, $\Delta P_V = P_{meas} - P_{Tnom}$:

ΔP_V at 9.5 VDC or at 9.5	VDC =	0	dB
ΔP_V at 10.5 VDC or at 10.5	VDC =	0	dB
ΔP_T at 10.0 VDC (=P_{Tmax}-P_{Tnom})	=	-0.3	dB

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Litton Q.A. LITTON 1180 Date MAY 26 1998

CODE IDENT NO.	SIZE	NUMBER	REV	SHEET 42 OF 68
56348	A	1300823	B3	

TEST DATA SHEET 7.7
FUNCTIONAL PERFORMANCE TESTS
INITIAL DATA SET N/A FINAL DATA SET ✓

LITTON TYPE LSE 9038 AM AESD 1336610- 3
SERIAL NUMBER: 85092 QUAL TEST ✓ ACCEPT TEST N/A

Power Supply Immunity, Ref. Test Para. 5.2.4

SPECIFICATION	MEASUREMENT AT Tnom ± 1°C		LIMIT
Initial Measurement			
Temperature	21	°C	Table IIIB
Input Voltage	10	VDC	10.0 ± 0.2 VDC
Input Current	179	mA	Table IIIB
Input Power	1.79	W DC	Pdiss max
Frequency (f_{Tnom})	50.30039	GHz	Table IIIB
RF Output Power	13.5	dBm	12 to 17 dBm
Frequency Setting Accuracy, Δf_S (= f_{Tnom}-F_o)	0.39	MHz	

Performance After Short Circuit on Power Supply: Ref Test Para 5.2.4.2

Input Voltage	10	VDC	10.0 ± 0.2 VDC
Input Current	179	mA	Table IIIB
Input Power	1.79	W DC	Pdiss max
Frequency	50.30041	GHz	Table IIIB
RF Output Power	13.5	dBm	12 to 17 dBm

Over Voltage: Ref Test Para 5.2.4.3

Overvoltage Input Voltage	28	VDC	+28V

Performance After Input Overvoltage

Input Voltage	10	VDC	10.0 ± 0.2 VDC
Input Current	179	mA	Table IIIB
Input Power	1.79	W DC	Pdiss max
Frequency	50.30021	GHz	Table IIIB
RF Output Power	13.5	dBm	12 to 17 dBm

Reverse Polarity: Ref Test Para 5.2.4.4

Reverse Input Voltage	-10	VDC	-10.0 ± 0.2 VDC

Performance After Reverse Input Voltage

Input Voltage	10	VDC	10.0 ± 0.2 VDC
Input Current	179	mA	Table IIIB
Input Power	1.79	W DC	Pdiss max
Frequency, f_{Tnom}	50.30033	GHz	Table IIIB
RF Output Power	13.5	dBm	12 to 17 dBm
Frequency Setting Accuracy, Δf_S (= f_{Tnom}-F_o)	0.33	MHz	

Accept ✓ Reject _____

Test Performed by DZ Date 5-15-98
Litton Q.A. LITTON Date MAY 26 1998

TEST DATA SHEET 7.23B
FUNCTIONAL PERFORMANCE TESTS
INITIAL DATA SET N/A FINAL DATA SET ✓

LITTON TYPE LSE 9036AM AESD 1336610-3
SERIAL NUMBER: 85032 QUAL TEST ✓ ACCEPT TEST N/A

Frequency Pulling and Load VSWR 2.5:1 max. all phases. Ref Test Para. 5.9

TEST DESCRIPTION		LIMITS
Output Open and Short. Ref. Test Para. 5.9.5		
Temperature	23 °C	24°C ± 5°C
Frequency:	50.300 00 GHz	Table IIIB
RF Output Power:	13.4 dBm	12 to 17 dBm
Input Voltage	10 VDC	10 ± 0.2 VDC
Input Current:	183 mA	Table IIIB
Results:	✓ Acceptable	No Damage or Degradation

Calculate maximum Frequency Accuracy (both positive and negative),
$\Delta f_{acc} = \Delta f_S$ (Use worst-case Δf_S from 7.2, 7.7, and 7.22A) + Δf_H (from 7.22A) + Δf_L (from 7.23A):

Maximum Δf_{acc} =	0.94 MHz (Positive)	Table IIIB
	-0.21 MHz (Negative)	Table IIIB

Calculate maximum Short-term Frequency Stability (both positive and negative),
$\Delta f_{V+T} = \Delta f_V + \Delta f_T$ (Use worst-case Δf_V and Δf_T from 7.2 thru 7.6):

Maximum Δf_{V+T} =	0.29 MHz (Positive)	Table IIIB
	-0.31 MHz (Negative)	Table IIIB

Calculate maximum overall RF Output Power Stability (both positive and negative),
$\Delta P_{OV} = \Delta P_V + \Delta P_T$ (Use worst-case ΔP_V and ΔP_T from 7.2 thru 7.6) + ΔP_H (from 7.22A) + ΔP_L (from 7.23A):

Maximum ΔP_{OV} =	.02 dB (Positive)	1.0 dB
	-0.5 dB (Negative)	-1.0 dB

Accept ✓ Reject _____

Test Performed by _____ Date 5-18-98

Litton Q.A. _____ Date MAY 26 1998

Channel 4 LO

DRO (P/N: 1336610-4, S/N: 85040)

LITTON
Solid State

TEST DATA SHEET 7.2
FUNCTIONAL PERFORMANCE TESTS
INITIAL DATA SET N/A FINAL DATA SET ✓

LITTON TYPE LS E 9036 AF/A AESD 1336610- 4
SERIAL NUMBER: 85040 QUAL TEST ✓ ACCEPT TEST N/A

Basic Electrical Test: Ref. Test Para. 5.2.2

SPECIFICATION	MEASUREMENT AT Tnom ±1°C		LIMIT
Measurement at Vop=10 VDC			
Temperature	22	°C	Table IIIB
Input Voltage	10	VDC	10.0 ± 0.2 VDC
Input Current	177	mA	Table IIIB
Input Power, P_{diss}	1.77	W DC	P_{diss} max
Frequency, f_{Tnom}	5280000	GHz	Table IIIB
RF Output Power, P_{Tnom}	13.6	dBm	12 to 17 dBm
Frequency Setting Accuracy, Δf_S (= f_{Tnom}-F_o)	0	MHz	

Frequency and RF Output Power Variation With Voltage, Ref. Test Para 5.2.3

Measurement at 9.5 VDC or at 9.5 VDC			
Temperature	22	°C	Table IIIB
Input Voltage	9.5	VDC	9.5 VDC or Para. 5.2.3.2
Input Current	175	mA	Table IIIB
Frequency, f_{meas}	5280000	GHz	Table IIIB
RF Output Power, P_{meas}	13.6	dBm	12 to 17 dBm

Measurement at 10.5 VDC or at 10.5 VDC			
Temperature	22	°C	Table IIIB
Input Voltage	10.5	VDC	10.5 VDC or Para. 5.2.3.3
Input Current	176	mA	Table IIIB
Frequency, f_{meas}	5280000	GHz	Table IIIB
RF Output Power, P_{meas}	13.6	dBm	12 to 17 dBm

Calculate Frequency Variation, $\Delta f_V = f_{meas} - f_{Tnom}$,

Δf_V at 9.5 VDC or at 9.5 VDC = 0 MHz
Δf_V at 10.5 VDC or at 10.5 VDC = 0 MHz

Calculate RF Output Power Variation, $\Delta P_V = P_{meas} - P_{Tnom}$,

ΔP_V at 9.5 VDC or at 9.5 VDC = 0 dB
ΔP_V at 10.5 VDC or at 10.5 VDC = 0 dB

Accept ✓ Reject _____

Test Performed by JED Date 03-27-98
Litton QA LITTON MEO Date MAR 31 1998 4-2-98

LITTON
Solid State

TEST DATA SHEET 7.3
FUNCTIONAL PERFORMANCE TESTS
INITIAL DATA SET N/A FINAL DATA SET ✓

LITTON TYPE LS £ 9036 AF/A AESD 1336610- 4
SERIAL NUMBER: 85040 QUAL TEST ✓ ACCEPT TEST N/A

Temperature Testing at T=10°C, Ref. Test Para. 5.2.5.1

SPECIFICATION	MEASUREMENT AT T=10° ±1°C		LIMIT
Measurement at Vop=10 VDC			
Temperature	10	°C	10° ± 1°C
Input Voltage	10	VDC	10.0 ± 0.2 VDC
Input Current	176	mA	Table IIIB
Input Power, P_{diss}	1.76	W DC	Pdiss max
Frequency, $f_{10°C}$	5279938	GHz	Table IIIB
RF Output Power, $P_{10°C}$	13.7	dBm	12 to 17 dBm

Frequency and RF Output Power Variation With Voltage, Ref. Test Para 5.2.5.1

Measurement at 9.5 VDC or at 9.5 VDC			
Temperature	10	°C	Table IIIB
Input Voltage	9.5	VDC	9.5 VDC or Para. 5.2.3.2
Input Current	174	mA	Table IIIB
Frequency, f_{meas}	5279936	GHz	Table IIIB
RF Output Power, P_{meas}	13.7	dBm	12 to 17 dBm
Measurement at 10.5 VDC or at 10.5 VDC			
Temperature	10	°C	Table IIIB
Input Voltage	10.5	VDC	10.5 VDC or Para. 5.2.3.3
Input Current	185	mA	Table IIIB
Frequency, f_{meas}	5279935	GHz	Table IIIB
RF Output Power, P_{meas}	13.7	dBm	12 to 17 dBm

Calculate Frequency Variation, $\Delta f_V = f_{meas} - f_{10°C}$:

Δf_V at 9.5 VDC or at 9.5	VDC =	- 0.02	MHz
Δf_V at 10.5 VDC or at 10.5	VDC =	- 0.03	MHz
Δf_T at 10.0 VDC ($=f_{10°C} - f_{Tnom}$)	=	- 0.62	MHz

Calculate RF Output Power Variation, $\Delta P_V = P_{meas} - P_{10°C}$:

ΔP_V at 9.5 VDC or at 9.5	VDC =	0	dE
ΔP_V at 10.5 VDC or at 10.5	VDC =	0	dE
ΔP_T at 10.0 VDC ($=P_{10°C} - P_{Tnom}$)	=	DH OK 0.1	dE

Accept ✓ Reject _____

Test Performed by JED Date 03.27.98
Litton Q.A. [signature] Date [illegible] 4-2-98

CODE IDENT NO.	SIZE	NUMBER	REV	SHEET 39 OF 68
56348	A	1300823	B3	

TEST DATA SHEET 7.4
FUNCTIONAL PERFORMANCE TESTS
INITIAL DATA SET N/A FINAL DATA SET ✓

LITTON TYPE LS E 9038 AF1A
SERIAL NUMBER: 85040 QUAL TEST ✓ AESD 1336610- 4
ACCEPT TEST N/A

Temperature Extreme Testing at Tmin, Ref. Test Para. 5.2.5.2

SPECIFICATION	MEASUREMENT AT Tmin ±1°C		LIMIT
Measurement at Vop=10 VDC			
Temperature	-1	°C	Table IIIB
Input Voltage	10	VDC	10.0 ± 0.2 VDC
Input Current	175	mA	Table IIIB
Input Power, P_{diss}	1.75	W DC	Pdiss max
Frequency, f_{Tmin}	5279831	GHz	Table IIIB
RF Output Power, P_{Tmin}	13.7	dBm	12 to 17 dBm

Frequency and RF Output Power Variation With Voltage, Ref. Test Para 5.2.5.2

Measurement at 9.5 VDC or at 9.5 VDC			
Temperature	-1	°C	Table IIIB
Input Voltage	9.5	VDC	9.5 VDC or Para 5.2.3.2
Input Current	172	mA	Table IIIB
Frequency, f_{meas}	5279828	GHz	Table IIIB
RF Output Power, P_{meas}	13.7	dBm	12 to 17 dBm

Measurement at 10.5 VDC or at 10.5 VDC			
Temperature	-1	°C	Table IIIB
Input Voltage	10.5	VDC	10.5 VDC or Para 5.2.3.3
Input Current	173	mA	Table IIIB
Frequency, f_{meas}	5279820	GHz	Table IIIB
RF Output Power, P_{meas}	13.7	dBm	12 to 17 dBm

Calculate Frequency Variation, $\Delta f_V = f_{meas} - f_{Tmin}$:

Δf_V at 9.5 VDC or at 9.5	VDC =	-0.03	MHz
Δf_V at 10.5 VDC or at 10.5	VDC =	-0.11	MHz
Δf_T at 10.0 VDC (=$f_{Tmin} - f_{Tnom}$)		-1.69	MHz

Calculate RF Output Power Variation, $\Delta P_V = P_{meas} - P_{Tmin}$:

ΔP_V at 9.5 VDC or at 9.5	VDC =	0	dB
ΔP_V at 10.5 VDC or at 10.5	VDC =	0	dB
ΔP_T at 10.0 VDC (=$P_{Tmin} - P_{Tnom}$)	=	0.1	dB

Accept ✓ Reject ____

Test Performed by JED Date 03-27-98
Litton Q.A. [signature] Date [illegible] RR 4-2-98

CODE IDENT NO.	SIZE	NUMBER	REV	SHEET 40 OF 68
56348	A	1300823	B3	

LITTON
Solid State

TEST DATA SHEET 7.5
FUNCTIONAL PERFORMANCE TESTS
INITIAL DATA SET N/A FINAL DATA SET ✓

LITTON TYPE LS E 9036 AF/A
SERIAL NUMBER: 85040 QUAL TEST ✓ AESD 1336610- 4
ACCEPT TEST N/A

Temperature Testing at T=30°C, Ref. Test Para. 5.2.5.3

SPECIFICATION	MEASUREMENT AT T=30° ±1°C		LIMIT
Measurement at Vop=10 VDC			
Temperature	30	°C	30° ± 1°C
Input Voltage	10	VDC	10.0 ± 0.2 VDC
Input Current	177	mA	Table IIIB
Input Power, P_{diss}	1.77	W DC	Pdiss max
Frequency, $f_{30°C}$	52.80028	GHz	Table IIIB
RF Output Power, $P_{30°C}$	13.3	dBm	12 to 17 dBm
Frequency and RF Output Power Variation With Voltage, Ref. Test Para 5.2.5.3			
Measurement at 9.5 VDC or at 9.5 VDC			
Temperature	30	°C	Table IIIB
Input Voltage	9.5	VDC	9.5 VDC or Para. 5.2.3.2
Input Current	175	mA	Table IIIB
Frequency, f_{meas}	52.80029	GHz	Table IIIB
RF Output Power, P_{meas}	13.3	dBm	12 to 17 dBm
Measurement at 10.5 VDC or at 10.5 VDC			
Temperature	30	°C	Table IIIB
Input Voltage	10.5	VDC	10.5 VDC or Para. 5.2.3.3
Input Current	176	mA	Table IIIB
Frequency, f_{meas}	52.80029	GHz	Table IIIB
RF Output Power, P_{meas}	13.3	dBm	12 to 17 dBm

Calculate Frequency Variation, $\Delta f_V = f_{meas} - f_{30°C}$:

Δf_V at 9.5 VDC or at 9.5	VDC =	0.01	MHz
Δf_V at 10.5 VDC or at 10.5	VDC =	0.01	MHz
Δf_T at 10.0 VDC ($=f_{30°C} - f_{Tnom}$)	=	0.28	MHz

Calculate RF Output Power Variation, $\Delta P_V = P_{meas} - P_{30°C}$:

ΔP_V at 9.5 VDC or at 9.5	VDC =	0	dB
ΔP_V at 10.5 VDC or at 10.5	VDC =	0	dB
ΔP_T at 10.0 VDC ($=P_{30°C} - P_{Tnom}$)	=	-0.3	dB

Accept ✓ Reject _____

Test Performed by DH Date 3-27-98
Litton Q.A. _____ Date MAR 31 1998 OK 4-2-98

TEST DATA SHEET 7.6
FUNCTIONAL PERFORMANCE TESTS
INITIAL DATA SET N/A FINAL DATA SET ✓

LITTON TYPE LS E 9036AF/A AESD 1336610- 4
SERIAL NUMBER: 85040 QUAL TEST ✓ ACCEPT TEST N/A

Temperature Extreme Testing at Tmax, Ref. Test Para. 5.2.5.4

SPECIFICATION	MEASUREMENT AT Tmax ±1°C		LIMIT
Measurement at Vop=10 VDC			
Temperature	44	°C	Table IIIB
Input Voltage	10	VDC	10.0 ± 0.2 VDC
Input Current	178	mA	Table IIIB
Input Power, P_{diss}	1.78	W DC	Pdiss max
Frequency, f_{Tmax}	52.80017	GHz	Table IIIB
RF Output Power, P_{Tmax}	13.3	dBm	12 to 17 dBm

Frequency and RF Output Power Variation With Voltage, Ref. Test Para 5.2.5.4

Measurement at 9.5 VDC or at 9.5 VDC			
Temperature	44	°C	Table IIIB
Input Voltage	9.5	VDC	9.5 VDC or Para 5.2.3.2
Input Current	176	mA	Table IIIB
Frequency, f_{meas}	52.80015	GHz	Table IIIB
RF Output Power, P_{meas}	13.3	dBm	12 to 17 dBm

Measurement at 10.5 VDC or at 10.5 VDC			
Temperature	44	°C	Table IIIB
Input Voltage	10.5	VDC	10.5 VDC or Para 5.2.3.3
Input Current	176	mA	Table IIIB
Frequency, f_{meas}	52.80014	GHz	Table IIIB
RF Output Power, P_{meas}	13.3	dBm	12 to 17 dBm

Calculate Frequency Variation, $\Delta f_V = f_{meas} - f_{Tmax}$:

Δf_V at 9.5 VDC or at 9.5	VDC =	-0.03	MHz
Δf_V at 10.5 VDC or at 10.5	VDC =	-0.03	MHz
Δf_T at 10.0V (=f_{Tmax} -f_{Tnom})	=	0.17	MHz

Calculate RF Output Power Variation, $\Delta P_V = P_{meas} - P_{Tnom}$:

ΔP_V at 9.5 VDC or at 9.5	VDC =	0	dB
ΔP_V at 10.5 VDC or at 10.5	VDC =	0	dB
ΔP_T at 10.0 VDC (=P_{Tmax}-P_{Tnom})	=	-0.3	dB

Accept ✓ Reject _____

Test Performed by _____ Date 3-27-98
Litton Q.A. _____ Date ~~MAR 31 1998~~ 4-2-98

CODE IDENT NO.	SIZE	NUMBER	REV	SHEET 42 OF 68
56348	A	1300823	B3	

LITTON
Solid State

TEST DATA SHEET 7.7
FUNCTIONAL PERFORMANCE TESTS
INITIAL DATA SET N/A FINAL DATA SET ✓

LITTON TYPE LS E9036AF/A AESD 1336610- 4
SERIAL NUMBER: 85040 QUAL TEST ✓ ACCEPT TEST N/A

Power Supply Immunity, Ref. Test Para. 5.2.4

SPECIFICATION	MEASUREMENT AT Tnom ±1°C		LIMIT
Initial Measurement			
Temperature	22	°C	Table IIIB
Input Voltage	10	VDC	10.0 ± 0.2 VDC
Input Current	177	mA	Table IIIB
Input Power	1.77	W DC	Pdiss max
Frequency (f_{Tnom})	52.79992	GHz	Table IIIB
RF Output Power	13.7	dBm	12 to 17 dBm
Frequency Setting Accuracy, Δf_S (= f_{Tnom}-F_o)	-.08	MHz	

Performance After Short Circuit on Power Supply: Ref Test Para 5.2.4.2

Input Voltage	10	VDC	10.0 ± 0.2 VDC
Input Current	177	mA	Table IIIB
Input Power	1.77	W DC	Pdiss max
Frequency	52.79990	GHz	Table IIIB
RF Output Power	13.7	dBm	12 to 17 dBm

Over Voltage: Ref Test Para 5.2.4.3

Overvoltage Input Voltage	28	VDC	+28V

Performance After Input Overvoltage

Input Voltage	10	VDC	10.0 ± 0.2 VDC
Input Current	177	mA	Table IIIB
Input Power	1.77	W DC	Pdiss max
Frequency	52.79991	GHz	Table IIIB
RF Output Power	13.7	dBm	12 to 17 dBm

Reverse Polarity: Ref Test Para 5.2.4.4

Reverse Input Voltage	-10	VDC	-10.0 ± 0.2 VDC

Performance After Reverse Input Voltage

Input Voltage	10	VDC	10.0 ± 0.2 VDC
Input Current	177	mA	Table IIIB
Input Power	1.77	W DC	Pdiss max
Frequency, f_{Tnom}	52.79992	GHz	Table IIIB
RF Output Power	13.7	dBm	12 to 17 dBm
Frequency Setting Accuracy, Δf_S (= f_{Tnom}-F_o)	-.08	MHz	

Accept ✓ Reject _____

Test Performed by DM Date 3-26-98
Litton Q.A. _____ Date 4-2-98

TEST DATA SHEET 7.23B
FUNCTIONAL PERFORMANCE TESTS
INITIAL DATA SET N/A FINAL DATA SET ✓

LITTON TYPE LS E-9036 AF/A
SERIAL NUMBER: 85040 QUAL TEST ✓ AESD 1336610-4
ACCEPT TEST N/A

Frequency Pulling and Load VSWR 2.5:1 max. all phases. Ref Test Para. 5.9

TEST DESCRIPTION		LIMITS
Output Open and Short. Ref. Test Para. 5.9.5		
Temperature	23 °C	24°C ± 5°C
Frequency:	52.80035 GHz	Table IIIB
RF Output Power:	13.7 dBm	12 to 17 dBm
Input Voltage	10 VDC	10 ± 0.2 VDC
Input Current:	177 mA	Table IIIB
Results:	✓ Acceptable	No Damage or Degradation

Calculate maximum Frequency Accuracy (both positive and negative),
$\Delta f_{acc} = \Delta f_S$ (Use worst-case Δf_S from 7.2, 7.7, and 7.22A) + Δf_H (from 7.22A) + Δf_L (from 7.23A):

Maximum Δf_{acc} =	0.48 MHz (Positive)	Table IIIB
	-0.09 MHz (Negative)	Table IIIB

Calculate maximum Short-term Frequency Stability (both positive and negative),
$\Delta f_{V+T} = \Delta f_V + \Delta f_T$ (Use worst-case Δf_V and Δf_T from 7.2 thru 7.6):

Maximum Δf_{V+T} =	0.29 MHz (Positive)	Table IIIB
	-1.8 MHz (Negative)	Table IIIB

Calculate maximum overall RF Output Power Stability (both positive and negative),
$\Delta P_{OV} = \Delta P_V + \Delta P_T$ (Use worst-case ΔP_V and ΔP_T from 7.2 thru 7.6) + ΔP_H (from 7.22A) + ΔP_L (from 7.23A):

Maximum ΔP_{OV} =	0.75 dB (Positive)	1.0 dB
	-0.95 dB (Negative)	-1.0 dB

Accept ✓ Reject _____

Test Performed by DH Date 3-27-98

Litton Q.A. [illegible] Date ~~3-31-1998~~ 4-2-98

CODE IDENT NO.	SIZE	NUMBER	REV	SHEET 61 OF 68
56348	A	1300823	B3	

Channel 5 LO

DRO (P/N: 1336610-5, S/N: 85031)

LITTON
Solid State

TEST DATA SHEET 7.2
FUNCTIONAL PERFORMANCE TESTS
INITIAL DATA SET N/A FINAL DATA SET ✓

LITTON TYPE LSE 9036 AA/A — AESD 1336610-5
SERIAL NUMBER: 85031 — QUAL TEST ✓ — ACCEPT TEST N/A

Basic Electrical Test; Ref. Test Para. 5.2.2

SPECIFICATION	MEASUREMENT AT Tnom ±1°C	LIMIT
Measurement at Vop=10 VDC		
Temperature	22 °C	Table IIIB
Input Voltage	10 VDC	10.0 ± 0.2 VDC
Input Current	182 mA	Table IIIB
Input Power, P_{diss}	1.82 W DC	P_{diss} max
Frequency, f_{Tnom}	53.59629 GHz	Table IIIB
RF Output Power, P_{Tnom}	12.16 dBm	12 to 17 dBm
Frequency Setting Accuracy, Δf_S (= f_{Tnom}-F_o)	0.29 MHz	
Frequency and RF Output Power Variation With Voltage, Ref. Test Para 5.2.3		
Measurement at 9.5 VDC or at ___ VDC		
Temperature	22 °C	Table IIIB
Input Voltage	9.5 VDC	9.5 VDC or Para. 5.2.3.2
Input Current	180 mA	Table IIIB
Frequency, f_{meas}	53.59629 GHz	Table IIIB
RF Output Power, P_{meas}	12.16 dBm	12 to 17 dBm
Measurement at 10.5 VDC or at ___ VDC		
Temperature	22 °C	Table IIIB
Input Voltage	10 VDC	10.5 VDC or Para. 5.2.3.3
Input Current	181 mA	Table IIIB
Frequency, f_{meas}	52.59629 GHz	Table IIIB
RF Output Power, P_{meas}	12.16 dBm	12 to 17 dBm

Calculate Frequency Variation, $\Delta f_V = f_{meas} - f_{Tnom}$

Δf_V at 9.5 VDC or at ___ VDC = 0 MHz
Δf_V at 10.5 VDC or at ___ VDC = 0 MHz

Calculate RF Output Power Variation, $\Delta P_V = P_{meas} - P_{Tnom}$

ΔP_V at 9.5 VDC or at ___ VDC = 0 dB
ΔP_V at 10.5 VDC or at ___ VDC = 0 dB

Accept ✓ Reject ___

Test Performed by [illegible] Date 3-19-98
Litton QA [illegible] Date MAR 26 1998

CODE IDENT NO.	SIZE	NUMBER	REV	SHEET 38 OF 68
56348	A	1300823	B3	

LITTON
Solid State

TEST DATA SHEET 7.3
FUNCTIONAL PERFORMANCE TESTS
INITIAL DATA SET N/A FINAL DATA SET ✓

LITTON TYPE LS E9036AG/A AESD 1336610- 5
SERIAL NUMBER: 85031 QUAL TEST ✓ ACCEPT TEST N/A

Temperature Testing at T=10°C, Ref. Test Para. 5.2.5.1

SPECIFICATION	MEASUREMENT AT T=10° ±1°C		LIMIT
Measurement at Vop=10 VDC			
Temperature	10	°C	10° ± 1°C
Input Voltage	10	VDC	10.0 ± 0.2 VDC
Input Current	180	mA	Table IIIB
Input Power, P_{diss}	1.80	W DC	Pdiss max
Frequency, $f_{10°C}$	52.59631	GHz	Table IIIB
RF Output Power, $P_{10°C}$	12.26	dBm	12 to 17 dBm
Frequency and RF Output Power Variation With Voltage, Ref. Test Para 5.2.5.1			
Measurement at 9.5 VDC or at ~ VDC			
Temperature	10	°C	Table IIIB
Input Voltage	9.5	VDC	9.5 VDC or Para. 5.2.3.2
Input Current	178	mA	Table IIIB
Frequency, f_{meas}	52.59632	GHz	Table IIIB
RF Output Power, P_{meas}	12.26	dBm	12 to 17 dBm
Measurement at 10.5 VDC or at ~ VDC			
Temperature	10	°C	Table IIIB
Input Voltage	10.5	VDC	10.5 VDC or Para. 5.2.3.3
Input Current	179	mA	Table IIIB
Frequency, f_{meas}	52.59631	GHz	Table IIIB
RF Output Power, P_{meas}	12.26	dBm	12 to 17 dBm

Calculate Frequency Variation, $\Delta f_V = f_{meas} - f_{10°C}$:

Δf_V at 9.5 VDC or at ~	VDC =	0.01	MHz
Δf_V at 10.5 VDC or at ~	VDC =	0	MHz
Δf_T at 10.0 VDC (=$f_{10°C} - f_{Tnom}$)	=	0.02	MHz

Calculate RF Output Power Variation, $\Delta P_V = P_{meas} - P_{10°C}$:

ΔP_V at 9.5 VDC or at ~	VDC =	0	dB
ΔP_V at 10.5 VDC or at ~	VDC =	0	dB
ΔP_T at 10.0 VDC (=$P_{10°C} - P_{Tnom}$)	=	0.1	dB

Accept ✓ Reject _____

Test Performed by [illegible] Date 3-19-98
Litton Q.A. [illegible] Date MAR 26 1998

LITTON
Solid State

TEST DATA SHEET 7.4
FUNCTIONAL PERFORMANCE TESTS
INITIAL DATA SET N/A FINAL DATA SET ✓

LITTON TYPE LS E 9036 A G-1A AESD 1336610- 5
SERIAL NUMBER: 85031 QUAL TEST ✓ ACCEPT TEST N/A

Temperature Extreme Testing at Tmin, Ref. Test Para. 5.2.5.2

SPECIFICATION	MEASUREMENT AT Tmin ±1°C		LIMIT
Measurement at Vop=10 VDC			
Temperature	0	°C	Table IIIB
Input Voltage	10	VDC	10.0 ± 0.2 VDC
Input Current	179	mA	Table IIIB
Input Power, P_{diss}	1.79	W DC	Pdiss max
Frequency, f_{Tmin}	53.59625	GHz	Table IIIB
RF Output Power, P_{Tmin}	11.86	dBm ✗	12 to 17 dBm

Frequency and RF Output Power Variation With Voltage, Ref. Test Para 5.2.5.2

Measurement at 9.5 VDC or at — VDC			
Temperature	0	°C	Table IIIB
Input Voltage	9.5	VDC	9.5 VDC or Para 5.2.3.2
Input Current	177	mA	Table IIIB
Frequency, f_{meas}	53.59625	GHz	Table IIIB
RF Output Power, P_{meas}	11.86	dBm ✳	12 to 17 dBm

Measurement at 10.5 VDC or at — VDC			
Temperature	0	°C	Table IIIB
Input Voltage	10.5	VDC	10.5 VDC or Para 5.2.3.3
Input Current	178	mA	Table IIIB
Frequency, f_{meas}	53.59624	GHz	Table IIIB
RF Output Power, P_{meas}	11.86	dBm ✳	12 to 17 dBm

Calculate Frequency Variation, $\Delta f_V = f_{meas} - f_{Tmin}$:

Δf_V at 9.5 VDC or at —	VDC =	0	MHz
Δf_V at 10.5 VDC or at —	VDC =	-0.01	MHz
Δf_T at 10.0 VDC (=f_{Tmin} -f_{Tnom})		-0.04	MHz

Calculate RF Output Power Variation, $\Delta P_V = P_{meas} - P_{Tmin}$:

ΔP_V at 9.5 VDC or at —	VDC =	0	dB
ΔP_V at 10.5 VDC or at —	VDC =	0	dB
ΔP_T at 10.0 VDC (=P_{Tmin} -P_{Tnom})	=	-0.3	dB

DW

Accept ✗ Reject ✓

SDAR # 98-056

Test Performed by [illegible] Date 3-19-98
Litton Q.A. [illegible] Date 4-9-98

LITTON 1986

CODE IDENT NO.	SIZE	NUMBER	REV	SHEET 40 OF 68
56348	A	1300823	B3	

LITTON
Solid State

TEST DATA SHEET 7.5
FUNCTIONAL PERFORMANCE TESTS
INITIAL DATA SET N/A FINAL DATA SET ✓

LITTON TYPE LS E 9036 AG/A AESD 1336610- 5
SERIAL NUMBER: 85031 QUAL TEST ✓ ACCEPT TEST N/A

Temperature Testing at T=30°C, Ref. Test Para. 5.2.5.3

SPECIFICATION	MEASUREMENT AT T=30° ±1°C		LIMIT
Measurement at Vop=10 VDC			
Temperature	29	°C	30° ± 1°C
Input Voltage	10	VDC	10.0 ± 0.2 VDC
Input Current	184	mA	Table IIIB
Input Power, P_{diss}	1.84	W DC	Pdiss max
Frequency, $f_{30°C}$	53.59638	GHz	Table IIIB
RF Output Power, $P_{30°C}$	12.16	dBm	12 to 17 dBm
Frequency and RF Output Power Variation With Voltage, Ref. Test Para 5.2.5.3			
Measurement at 9.5 VDC or at ~ VDC			
Temperature	29	°C	Table IIIB
Input Voltage	9.5	VDC	9.5 VDC or Para. 5.2.3.2
Input Current	182	mA	Table IIIB
Frequency, f_{meas}	53.59638	GHz	Table IIIB
RF Output Power, P_{meas}	12.16	dBm	12 to 17 dBm
Measurement at 10.5 VDC or at ~ VDC			
Temperature	29	°C	Table IIIB
Input Voltage	10.5	VDC	10.5 VDC or Para. 5.2.3.3
Input Current	183	mA	Table IIIB
Frequency, f_{meas}	53.59637	GHz	Table IIIB
RF Output Power, P_{meas}	12.16	dBm	12 to 17 dBm

Calculate Frequency Variation, $\Delta f_V = f_{meas} - f_{30°C}$:

Δf_V at 9.5 VDC or at ~	VDC =	0	MHz
Δf_V at 10.5 VDC or at ~	VDC =	-0.01	MHz
Δf_T at 10.0 VDC (=$f_{30°C}$ -f_{Tnom})	=	0.08 (0.09)	MHz

Calculate RF Output Power Variation, $\Delta P_V = P_{meas} - P_{30°C}$:

ΔP_V at 9.5 VDC or at ~	VDC =	0	dB
ΔP_V at 10.5 VDC or at ~	VDC =	0	dB
ΔP_T at 10.0 VDC (=$P_{30°C}$ -P_{Tnom})	=	0	dB

Accept ✓ Reject _____

Test Performed by [signature] Date 3-10-98
Litton Q.A. [signature] Date MAR 26 1998

CODE IDENT NO.	SIZE	NUMBER	REV	SHEET 41 OF 68
56348	A	1300823	B3	

LITTON
Solid State

TEST DATA SHEET 7.6
FUNCTIONAL PERFORMANCE TESTS
INITIAL DATA SET N/A FINAL DATA SET ✓

LITTON TYPE LS E 9036AG/A AESD 1336610- 5
SERIAL NUMBER: 85031 QUAL TEST ✓ ACCEPT TEST N/A

Temperature Extreme Testing at Tmax, Ref. Test Para. 5.2.5.4

SPECIFICATION	MEASUREMENT AT Tmax ±1°C		LIMIT
Measurement at Vop=10 VDC			
Temperature	44	°C	Table IIIB
Input Voltage	10	VDC	10.0 ± 0.2 VDC
Input Current	187	mA	Table IIIB
Input Power, P_{diss}	1.87	W DC	Pdiss max
Frequency, f_{Tmax}	53.59612	GHz	Table IIIB
RF Output Power, P_{Tmax}	12.1	dBm	12 to 17 dBm
Frequency and RF Output Power Variation With Voltage, Ref. Test Para 5.2.5.4			
Measurement at 9.5 VDC or at ~ VDC			
Temperature	44	°C	Table IIIB
Input Voltage	9.5	VDC	9.5 VDC or Para 5.2.3.2
Input Current	185	mA	Table IIIB
Frequency, f_{meas}	53.59610	GHz	Table IIIB
RF Output Power, P_{meas}	12.1	dBm	12 to 17 dBm
Measurement at 10.5 VDC or at ~ VDC			
Temperature	44	°C	Table IIIB
Input Voltage	10.5	VDC	10.5 VDC or Para 5.2.3.3
Input Current	185	mA	Table IIIB
Frequency, f_{meas}	53.59609	GHz	Table IIIB
RF Output Power, P_{meas}	12.1	dBm	12 to 17 dBm

Calculate Frequency Variation, $\Delta f_V = f_{meas} - f_{Tmax}$:

Δf_V at 9.5 VDC or at ~	VDC =	-0.02	MHz
Δf_V at 10.5 VDC or at ~	VDC =	-0.03	MHz
Δf_T at 10.0V (=f_{Tmax} -f_{Tnom})	=	-0.17	MHz

Calculate RF Output Power Variation, $\Delta P_V = P_{meas} - P_{Tnom}$:

ΔP_V at 9.5 VDC or at ~	VDC =	0	dB
ΔP_V at 10.5 VDC or at ~	VDC =	0	dB
ΔP_T at 10.0 VDC (=P_{Tmax}-P_{Tnom})	=	-.06	dB

Accept ✓ Reject _____

Test Performed by _____ Date 3-19-98
Litton Q.A. _____ Date MAR 26 1998

LITTON
Solid State

TEST DATA SHEET 7.7
FUNCTIONAL PERFORMANCE TESTS
INITIAL DATA SET N/A FINAL DATA SET ✓

LITTON TYPE LS E 9036 A B-1A AESD 1336610- 5
SERIAL NUMBER: 85031 QUAL TEST ✓ ACCEPT TEST N/A

Power Supply Immunity, Ref. Test Para. 5.2.4

SPECIFICATION	MEASUREMENT AT Tnom ±1°C		LIMIT
Initial Measurement			
Temperature	22	°C	Table IIIB
Input Voltage	10	VDC	10.0 ± 0.2 VDC
Input Current	183	mA	Table IIIB
Input Power	1.83	W DC	Pdiss max
Frequency (f_{Tnom})	53.59634	GHz	Table IIIB
RF Output Power	12.2	dBm	12 to 17 dBm
Frequency Setting Accuracy, Δf_S (= f_{Tnom}-F_o)	0.34	MHz	

Performance After Short Circuit on Power Supply: Ref Test Para 5.2.4.2

Input Voltage	10	VDC	10.0 ± 0.2 VDC
Input Current	183	mA	Table IIIB
Input Power	1.83	W DC	Pdiss max
Frequency	53.59629	GHz	Table IIIB
RF Output Power	12.2	dBm	12 to 17 dBm

Over Voltage: Ref Test Para 5.2.4.3

Overvoltage Input Voltage	28	VDC	+28V

Performance After Input Overvoltage

Input Voltage	10	VDC	10.0 ± 0.2 VDC
Input Current	183	mA	Table IIIB
Input Power	1.83	W DC	Pdiss max
Frequency	53.59629	GHz	Table IIIB
RF Output Power	12.2	dBm	12 to 17 dBm

Reverse Polarity: Ref Test Para 5.2.4.4

Reverse Input Voltage	-10	VDC	-10.0 ± 0.2 VDC

Performance After Reverse Input Voltage

Input Voltage	10	VDC	10.0 ± 0.2 VDC
Input Current	183	mA	Table IIIB
Input Power	1.83	W DC	Pdiss max
Frequency, f_{Tnom}	53.59634	GHz	Table IIIB
RF Output Power	12.2	dBm	12 to 17 dBm
Frequency Setting Accuracy, Δf_S (= f_{Tnom}-F_o)	0.34	MHz	

Accept ✓ Reject ____

Test Performed by DH Date 3-19-98

Litton Q.A. ____ Date MAR 26 1998

TEST DATA SHEET 7.23B
FUNCTIONAL PERFORMANCE TESTS
INITIAL DATA SET N/A FINAL DATA SET ✓

LITTON TYPE LS E 9036AG/A AESD 1336610-5
SERIAL NUMBER: 85031 QUAL TEST ✓ ACCEPT TEST N/A

Frequency Pulling and Load VSWR 2.5:1 max. all phases. Ref Test Para. 5.9

TEST DESCRIPTION		LIMITS
Output Open and Short. Ref. Test Para. 5.9.5		
Temperature	23 °C	24°C ± 5°C
Frequency:	53.59651 GHz	Table IIIB
RF Output Power:	12.26 dBm	12 to 17 dBm
Input Voltage	10 VDC	10 ± 0.2 VDC
Input Current:	183 mA	Table IIIB
Results:	✓ Acceptable	No Damage or Degradation

Calculate maximum Frequency Accuracy (both positive and negative),
$\Delta f_{acc} = \Delta f_S$ (Use worst-case Δf_S from 7.2, 7.7, and 7.22A) + Δf_H (from 7.22A) + Δf_L (from 7.23A):

Maximum Δf_{acc} =	0.55 MHz (Positive)	Table IIIB
	-0.18 MHz (Negative)	Table IIIB

Calculate maximum Short-term Frequency Stability (both positive and negative),
$\Delta f_{V+T} = \Delta f_V + \Delta f_T$ (Use worst-case Δf_V and Δf_T from 7.2 thru 7.6):

Maximum Δf_{V+T} =	.09 MHz (Positive)	Table IIIB
	-.20 MHz (Negative)	Table IIIB

Calculate maximum overall RF Output Power Stability (both positive and negative),
$\Delta P_{OV} = \Delta P_V + \Delta P_T$ (Use worst-case ΔP_V and ΔP_T from 7.2 thru 7.6) + ΔP_H (from 7.22A) + ΔP_L (from 7.23A):

Maximum ΔP_{OV} =	0.8 dB (Positive)	1.0 dB
	-0.9 dB (Negative)	-1.0 dB

Accept ✓ Reject _____

Test Performed by DH Date 3-24-98

Litton Q.A. [signature] Date MAR 26 1998

Channel 6 LO

DRO (P/N: 1336610-6, S/N: 85015)

LITTON
Solid State

TEST DATA SHEET 7.2
FUNCTIONAL PERFORMANCE TESTS
INITIAL DATA SET_____ FINAL DATA SET ✓

LITTON TYPE LS E9036 AH/A — AESD 1336610-6
SERIAL NUMBER: 85015 — QUAL TEST _____ — ACCEPT TEST ✓

Basic Electrical Test; Ref. Test Para. 5.2.2

SPECIFICATION	MEASUREMENT AT Tnom ±1°C		LIMIT
Measurement at Vop=10 VDC			
Temperature	21.5	°C	Table IIIB
Input Voltage	10.	VDC	10.0 ± 0.2 VDC
Input Current	178	mA	Table IIIB
Input Power, P_{diss}	1.78	W DC	P_{diss} max
Frequency, f_{Tnom}	5439986	GHz	Table IIIB
RF Output Power, P_{Tnom}	12.6	dBm	12 to 17 dBm
Frequency Setting Accuracy, Δf_S (= f_{Tnom}-F_o)	-.14	MHz	

Frequency and RF Output Power Variation With Voltage, Ref. Test Para 5.2.3

Measurement at 9.5 VDC or at 9.5 VDC			
Temperature	21.5	°C	Table IIIB
Input Voltage	9.5	VDC	9.5 VDC or Para. 5.2.3.2
Input Current	176	mA	Table IIIB
Frequency, f_{meas}	5439986	GHz	Table IIIB
RF Output Power, P_{meas}	12.6	dBm	12 to 17 dBm
Measurement at 10.5 VDC or at 10.5 VDC			
Temperature	21.5	°C	Table IIIB
Input Voltage	10.5	VDC	10.5 VDC or Para. 5.2.3.3
Input Current	178	mA	Table IIIB
Frequency, f_{meas}	5439986	GHz	Table IIIB
RF Output Power, P_{meas}	12.6	dBm	12 to 17 dBm

Calculate Frequency Variation, $\Delta f_V = f_{meas} - f_{Tnom}$,

Δf_V at 9.5 VDC or at _____ VDC = ϕ MHz
Δf_V at 10.5 VDC or at _____ VDC = ϕ MHz

Calculate RF Output Power Variation, $\Delta P_V = P_{meas} - P_{Tnom}$,

ΔP_V at 9.5 VDC or at _____ VDC = ϕ dB
ΔP_V at 10.5 VDC or at _____ VDC = ϕ dB

Accept ✓ Reject _____

Test Performed by _____ Date 12-10-97
Litton QA _____ Date _____

LITTON

LITTON
Solid State

TEST DATA SHEET 7.3
FUNCTIONAL PERFORMANCE TESTS
INITIAL DATA SET _____ FINAL DATA SET ✓

LITTON TYPE LS E 9036 AH/A
SERIAL NUMBER: 85015 QUAL TEST _____
AESD 1336610- 6
ACCEPT TEST ✓

Temperature Testing at T=10°C, Ref. Test Para. 5.2.5.1

SPECIFICATION	MEASUREMENT AT T=10° ±1°C		LIMIT
Measurement at Vop=10 VDC			
Temperature	10.3	°C	10° ± 1°C
Input Voltage	10.	VDC	10.0 ± 0.2 VDC
Input Current	177	mA	Table IIIB
Input Power, P_{diss}	1.77	W DC	Pdiss max
Frequency, $f_{10°C}$	5439965	GHz	Table IIIB
RF Output Power, $P_{10°C}$	12.6	dBm	12 to 17 dBm

Frequency and RF Output Power Variation With Voltage, Ref. Test Para 5.2.5.1

Measurement at 9.5 VDC or at 9.5 VDC			
Temperature	10.3	°C	Table IIIB
Input Voltage	9.5	VDC	9.5 VDC or Para. 5.2.3.2
Input Current	175	mA	Table IIIB
Frequency, f_{meas}	5439964	GHz	Table IIIB
RF Output Power, P_{meas}	12.6	dBm	12 to 17 dBm
Measurement at 10.5 VDC or at 10.5 VDC			
Temperature	10.3	°C	Table IIIB
Input Voltage	10.5	VDC	10.5 VDC or Para. 5.2.3.3
Input Current	171	mA	Table IIIB
Frequency, f_{meas}	5439964	GHz	Table IIIB
RF Output Power, P_{meas}	12.6	dBm	12 to 17 dBm

Calculate Frequency Variation, $\Delta f_V = f_{meas} - f_{10°C}$:

Δf_V at 9.5 VDC or at _____	VDC =	-.01	MHz
Δf_V at 10.5 VDC or at _____	VDC =	-.01	MHz
Δf_T at 10.0 VDC ($=f_{10°C} - f_{Tnom}$)	=	-.21	MHz

Calculate RF Output Power Variation, $\Delta P_V = P_{meas} - P_{10°C}$:

ΔP_V at 9.5 VDC or at _____	VDC =	ϕ	dB
ΔP_V at 10.5 VDC or at _____	VDC =	ϕ	dB
ΔP_T at 10.0 VDC ($=P_{10°C} - P_{Tnom}$)	=	ϕ	dB

Accept ✓ Reject _____

Test Performed by DH Date 12-10-97
Litton Q.A. _____ LITTON M 60 Date DEC 12 1997

CODE IDENT NO.	SIZE	NUMBER	REV	SHEET 39 OF 68
56348	A	1300823	B3	

TEST DATA SHEET 7.4
FUNCTIONAL PERFORMANCE TESTS
INITIAL DATA SET _____ FINAL DATA SET ✓

LITTON TYPE LS E 9036 AH/A — AESD 1336610- 6
SERIAL NUMBER: 85015 — QUAL TEST _____ — ACCEPT TEST ✓

Temperature Extreme Testing at Tmin, Ref. Test Para. 5.2.5.2

SPECIFICATION	MEASUREMENT AT Tmin ±1°C		LIMIT
Measurement at Vop=10 VDC			
Temperature	-.2	°C	Table IIIB
Input Voltage	10.	VDC	10.0 ± 0.2 VDC
Input Current	175	mA	Table IIIB
Input Power, P_{diss}	1.75	W DC	Pdiss max
Frequency, f_{Tmin}	5439940	GHz	Table IIIB
RF Output Power, P_{Tmin}	12.5	dBm	12 to 17 dBm

Frequency and RF Output Power Variation With Voltage, Ref. Test Para 5.2.5.2

Measurement at 9.5 VDC or at 9.5 VDC			
Temperature	-.3	°C	Table IIIB
Input Voltage	9.5	VDC	9.5 VDC or Para 5.2.3.2
Input Current	173	mA	Table IIIB
Frequency, f_{meas}	5439940	GHz	Table IIIB
RF Output Power, P_{meas}	12.5	dBm	12 to 17 dBm

Measurement at 10.5 VDC or at 10.5 VDC			
Temperature	-.3	°C	Table IIIB
Input Voltage	10.5	VDC	10.5 VDC or Para 5.2.3.3
Input Current	174	mA	Table IIIB
Frequency, f_{meas}	5439940	GHz	Table IIIB
RF Output Power, P_{meas}	12.5	dBm	12 to 17 dBm

Calculate Frequency Variation, $\Delta f_V = f_{meas} - f_{Tmin}$:

Δf_V at 9.5 VDC or at _____	VDC =	ϕ	MHz
Δf_V at 10.5 VDC or at _____	VDC =	ϕ	MHz
Δf_T at 10.0 VDC (=f_{Tmin} -f_{Tnom})		-.46	MHz

Calculate RF Output Power Variation, $\Delta P_V = P_{meas} - P_{Tmin}$:

ΔP_V at 9.5 VDC or at _____	VDC =	ϕ	dB
ΔP_V at 10.5 VDC or at _____	VDC =	ϕ	dB
ΔP_T at 10.0 VDC (=P_{Tmin} -P_{Tnom})	=	-.1	dB

Accept ✓ Reject _____

Test Performed by _____ LITTON M60 — Date 12-10-97
Litton Q.A. _____ — Date DEC 12 1997

LITTON
Solid State

TEST DATA SHEET 7.5
FUNCTIONAL PERFORMANCE TESTS
INITIAL DATA SET_____ FINAL DATA SET ✓

LITTON TYPE LS E 9036 AH/A
SERIAL NUMBER: 8515 QUAL TEST _____ AESD 1336610- 6
ACCEPT TEST ✓

Temperature Testing at T=30°C, Ref. Test Para. 5.2.5.3

SPECIFICATION	MEASUREMENT AT T=30° ±1°C		LIMIT
Measurement at Vop=10 VDC			
Temperature	30.3	°C	30° ± 1°C
Input Voltage	10.0	VDC	10.0 ± 0.2 VDC
Input Current	150	mA	Table IIIB
Input Power, P_{diss}	1.50	W DC	Pdiss max
Frequency, $f_{30°C}$	5439995	GHz	Table IIIB
RF Output Power, $P_{30°C}$	12.6	dBm	12 to 17 dBm

Frequency and RF Output Power Variation With Voltage, Ref. Test Para 5.2.5.3

Measurement at 9.5 VDC or at 9.5 VDC			
Temperature	30.3	°C	Table IIIB
Input Voltage	9.5	VDC	9.5 VDC or Para. 5.2.3.2
Input Current	178	mA	Table IIIB
Frequency, f_{meas}	5439995	GHz	Table IIIB
RF Output Power, P_{meas}	12.6	dBm	12 to 17 dBm

Measurement at 10.5 VDC or at 10.5 VDC			
Temperature	30.3	°C	Table IIIB
Input Voltage	10.5	VDC	10.5 VDC or Para. 5.2.3.3
Input Current	179	mA	Table IIIB
Frequency, f_{meas}	5439995	GHz	Table IIIB
RF Output Power, P_{meas}	12.6	dBm	12 to 17 dBm

Calculate Frequency Variation, $\Delta f_V = f_{meas} - f_{30°C}$:

Δf_V at 9.5 VDC or at _____	VDC =	ϕ	MHz
Δf_V at 10.5 VDC or at _____	VDC =	ϕ	MHz
Δf_T at 10.0 VDC (=$f_{30°C} - f_{Tnom}$)	=	+.09	MHz

Calculate RF Output Power Variation, $\Delta P_V = P_{meas} - P_{30°C}$:

ΔP_V at 9.5 VDC or at _____	VDC =	ϕ	dB
ΔP_V at 10.5 VDC or at _____	VDC =	ϕ	dB
ΔP_T at 10.0 VDC (=$P_{30°C} - P_{Tnom}$)	=	ϕ	dB

Accept ✓ Reject _____

Test Performed by DM Date 12-10-97
Litton Q.A. LITTON M 60 Date DEC 12 1997

LITTON
Solid State

TEST DATA SHEET 7.6
FUNCTIONAL PERFORMANCE TESTS
INITIAL DATA SET_____ FINAL DATA SET ✓

LITTON TYPE LS E 9036 AH/A — AESD 1336610- 6
SERIAL NUMBER: 85015 — QUAL TEST _____ — ACCEPT TEST ✓

Temperature Extreme Testing at Tmax, Ref. Test Para. 5.2.5.4

SPECIFICATION	MEASUREMENT AT Tmax ±1°C		LIMIT
Measurement at Vop=10 VDC			
Temperature	43.0	°C	Table IIIB
Input Voltage	10.	VDC	10.0 ± 0.2 VDC
Input Current	182	mA	Table IIIB
Input Power, P_{diss}	1.82	W DC	Pdiss max
Frequency, f_{Tmax}	5439988	GHz	Table IIIB
RF Output Power, P_{Tmax}	12.6	dBm	12 to 17 dBm

Frequency and RF Output Power Variation With Voltage, Ref. Test Para 5.2.5.4

Measurement at 9.5 VDC or at 9.5 VDC			
Temperature	43.0	°C	Table IIIB
Input Voltage	9.5	VDC	9.5 VDC or Para 5.2.3.2
Input Current	180	mA	Table IIIB
Frequency, f_{meas}	5439988	GHz	Table IIIB
RF Output Power, P_{meas}	12.6	dBm	12 to 17 dBm
Measurement at 10.5 VDC or at 10.5 VDC			
Temperature	43.0	°C	Table IIIB
Input Voltage	10.5	VDC	10.5 VDC or Para 5.2.3.3
Input Current	180	mA	Table IIIB
Frequency, f_{meas}	5439988	GHz	Table IIIB
RF Output Power, P_{meas}	12.6	dBm	12 to 17 dBm

Calculate Frequency Variation, $\Delta f_V = f_{meas} - f_{Tmax}$:

Δf_V at 9.5 VDC or at _____	VDC =	ϕ	MHz
Δf_V at 10.5 VDC or at _____	VDC =	ϕ	MHz
Δf_T at 10.0V ($=f_{Tmax} - f_{Tnom}$)	=	+.02	MHz

Calculate RF Output Power Variation, $\Delta P_V = P_{meas} - P_{Tnom}$:

ΔP_V at 9.5 VDC or at _____	VDC =	ϕ	dB
ΔP_V at 10.5 VDC or at _____	VDC =	ϕ	dB
ΔP_T at 10.0 VDC ($=P_{Tmax} - P_{Tnom}$)	=	ϕ	dB

Accept ✓ Reject _____

Test Performed by [signature] Date 12-10-97
Litton Q.A. [signature] Date DEC 12 1997

CODE IDENT NO.	SIZE	NUMBER	REV	SHEET 42 OF 68
56348	A	1300823	B3	

LITTON
Solid State

TEST DATA SHEET 7.7
FUNCTIONAL PERFORMANCE TESTS
INITIAL DATA SET_____ FINAL DATA SET ✓

LITTON TYPE LS E 9036AH/A AESD 1336610- 6
SERIAL NUMBER: 85015 QUAL TEST _____ ACCEPT TEST ✓

Power Supply Immunity, Ref. Test Para. 5.2.4

SPECIFICATION	MEASUREMENT AT Tnorl ±1°C		LIMIT
Initial Measurement			
Temperature	21	°C	Table IIIB
Input Voltage	10	VDC	10.0 ± 0.2 VDC
Input Current	179	mA	Table IIIB
Input Power	1.79	W DC	Pdiss max
Frequency (f_{Tnom})	54.39990	GHz	Table IIIB
RF Output Power	12.6	dBm	12 to 17 dBm
Frequency Setting Accuracy, Δf_S (= f_{Tnom}-F_o)	-.10	MHz	

Performance After Short Circuit on Power Supply: Ref Test Para 5.2.4.2

Input Voltage	10	VDC	10.0 ± 0.2 VDC
Input Current	179	mA	Table IIIB
Input Power	1.79	W DC	Pdiss max
Frequency	54.39990	GHz	Table IIIB
RF Output Power	12.6	dBm	12 to 17 dBm

Over Voltage: Ref Test Para 5.2.4.3

Overvoltage Input Voltage	28	VDC	+28V

Performance After Input Overvoltage

Input Voltage	10	VDC	10.0 ± 0.2 VDC
Input Current	179	mA	Table IIIB
Input Power	1.79	W DC	Pdiss max
Frequency	54.39990	GHz	Table IIIB
RF Output Power	12.6	dBm	12 to 17 dBm

Reverse Polarity: Ref Test Para 5.2.4.4

Reverse Input Voltage	-10	VDC	-10.0 ± 0.2 VDC

Performance After Reverse Input Voltage

Input Voltage	10	VDC	10.0 ± 0.2 VDC
Input Current	179	mA	Table IIIB
Input Power	1.79	W DC	Pdiss max
Frequency, f_{Tnom}	54.39990	GHz	Table IIIB
RF Output Power	12.6	dBm	12 to 17 dBm
Frequency Setting Accuracy, Δf_S (= f_{Tnom}-F_o)	-.10	MHz	

Accept ✓ Reject _____
Test Performed by _____ Date 12-10-97
Litton Q.A. _____ Date DEC 12 1997

CODE IDENT NO.	SIZE	NUMBER	REV	SHEET 43 OF 68
56348	A	1300823	B3	

TEST DATA SHEET 7.23B
FUNCTIONAL PERFORMANCE TESTS
INITIAL DATA SET _____ FINAL DATA SET ✓

LITTON TYPE LS E 9036 AH/A
SERIAL NUMBER: 85015 QUAL TEST _____
AESD 1336610- 6
ACCEPT TEST ✓

Frequency Pulling and Load VSWR 2.5:1 max. all phases. Ref Test Para. 5.9

TEST DESCRIPTION		LIMITS
Output Open and Short. Ref. Test Para. 5.9.5		
Temperature	21.6 °C	24°C ± 5°C
Frequency:	54.39981 GHz	Table IIIB
RF Output Power:	12.7 dBm	12 to 17 dBm
Input Voltage	10 VDC	10 ± 0.2 VDC
Input Current:	179 mA	Table IIIB
Results:	-.19 Acceptable	No Damage or Degradation

Calculate maximum Frequency Accuracy (both positive and negative),
$\Delta f_{acc} = \Delta f_S$ (Use worst-case Δf_S from 7.2, 7.7, and 7.22A) + Δf_H (from 7.22A) + Δf_L (from 7.23A):

Maximum Δf_{acc} =	+.08 MHz (Positive)	Table IIIB
	-.15 MHz (Negative)	Table IIIB

Calculate maximum Short-term Frequency Stability (both positive and negative),
$\Delta f_{V+T} = \Delta f_V + \Delta f_T$ (Use worst-case Δf_V and Δf_T from 7.2 thru 7.6):

Maximum Δf_{V+T} =	+.09 MHz (Positive)	Table IIIB
	-.47 MHz (Negative)	Table IIIB

Calculate maximum overall RF Output Power Stability (both positive and negative),
$\Delta P_{OV} = \Delta P_V + \Delta P_T$ (Use worst-case ΔP_V and ΔP_T from 7.2 thru 7.6) + ΔP_H (from 7.22A) + ΔP_L (from 7.23A):

Maximum ΔP_{OV} =	+.3 dB (Positive)	1.0 dB
	-.2 dB (Negative)	-1.0 dB

Accept ✓ Reject _____

Test Performed by _____ Date 12-11-97

Litton Q.A. _____ LITTON M 60 Date DEC 19 1997

CODE IDENT NO.	SIZE	NUMBER	REV	SHEET 61 OF 68
56348	A	1300823	B3	

Channel 7 LO

DRO (P/N: 1336610-7, S/N: 85018)

LITTON
Solid State

TEST DATA SHEET 7.2
FUNCTIONAL PERFORMANCE TESTS
INITIAL DATA SET N/A FINAL DATA SET ✓

LITTON TYPE LSE 9036 A1/A AESD 1336610-7
SERIAL NUMBER: 85018 QUAL TEST ✓ ACCEPT TEST —

Basic Electrical Test: Ref. Test Para. 5.2.2

SPECIFICATION	MEASUREMENT AT Tnom ±1°C		LIMIT
Measurement at Vop=10 VDC			
Temperature	22	°C	Table IIIB
Input Voltage	10	VDC	10.0 ± 0.2 VDC
Input Current	196	mA	Table IIIB
Input Power, P_{diss}	1.95	W DC	P_{diss} max
Frequency, f_{Tnom}	54 94068	GHz	Table IIIB
RF Output Power, P_{Tnom}	12.4	dBm	12 to 17 dBm
Frequency Setting Accuracy, Δf_S (= f_{Tnom}-F_o)	0.68	MHz	

Frequency and RF Output Power Variation With Voltage, Ref. Test Para 5.2.3

Measurement at 9.5 VDC or at 9.5 VDC			
Temperature	22	°C	Table IIIB
Input Voltage	9.5	VDC	9.5 VDC or Para. 5.2.3.2
Input Current	193	mA	Table IIIB
Frequency, f_{meas}	54 94068	GHz	Table IIIB
RF Output Power, P_{meas}	12.4	dBm	12 to 17 dBm
Measurement at 10.5 VDC or at 10.5 VDC			
Temperature	22	°C	Table IIIB
Input Voltage	10.5	VDC	10.5 VDC or Para. 5.2.3.3
Input Current	193	mA	Table IIIB
Frequency, f_{meas}	54 94068	GHz	Table IIIB
RF Output Power, P_{meas}	12.4	dBm	12 to 17 dBm

Calculate Frequency Variation, $\Delta f_V = f_{meas} - f_{Tnom}$,

Δf_V at 9.5 VDC or at 9.5 VDC = 0 MHz
Δf_V at 10.5 VDC or at 10.5 VDC = 0 MHz

Calculate RF Output Power Variation, $\Delta P_V = P_{meas} - P_{Tnom}$,

ΔP_V at 9.5 VDC or at 9.5 VDC = 0 dB
ΔP_V at 10.5 VDC or at 10.5 VDC = 0 dB

Accept ✓ Reject ____

Test Performed by JED Date 03-22-98
Litton QA LITTON M60 Date 4-1-98

CODE IDENT NO.	SIZE	NUMBER	REV	SHEET 38 OF 68
56348	A	1300823	B3	

LITTON
Solid State

TEST DATA SHEET 7.3
FUNCTIONAL PERFORMANCE TESTS
INITIAL DATA SET N/A FINAL DATA SET ✓

LITTON TYPE LS E 9036 A01A AESD 1336610- 7
SERIAL NUMBER: 85018 QUAL TEST ✓ ACCEPT TEST —

Temperature Testing at T=10°C. Ref. Test Para. 5.2.5.1

SPECIFICATION	MEASUREMENT AT T=10° ±1°C		LIMIT
Measurement at Vop=10 VDC			
Temperature	10	°C	10° ± 1°C
Input Voltage	10	VDC	10.0 ± 0.2 VDC
Input Current	193	mA	Table IIIB
Input Power, P_{diss}	1.93	W DC	Pdiss max
Frequency, $f_{10°C}$	5494059	GHz	Table IIIB
RF Output Power, $P_{10°C}$	12.6	dBm	12 to 17 dBm

Frequency and RF Output Power Variation With Voltage, Ref. Test Para 5.2.5.1

Measurement at 9.5 VDC or at 9.5 VDC			
Temperature	10	°C	Table IIIB
Input Voltage	9.5	VDC	9.5 VDC or Para. 5.2.3.2
Input Current	191	mA	Table IIIB
Frequency, f_{meas}	5494059	GHz	Table IIIB
RF Output Power, P_{meas}	12.6	dBm	12 to 17 dBm
Measurement at 10.5 VDC or at 10.5 VDC			
Temperature	10	°C	Table IIIB
Input Voltage	10.5	VDC	10.5 VDC or Para. 5.2.3.3
Input Current	191	mA	Table IIIB
Frequency, f_{meas}	5494059	GHz	Table IIIB
RF Output Power, P_{meas}	12.6	dBm	12 to 17 dBm

Calculate Frequency Variation, $\Delta f_V = f_{meas} - f_{10°C}$:

Δf_V at 9.5 VDC or at 9.5	VDC =	0	MHz
Δf_V at 10.5 VDC or at 10.5	VDC =	0	MHz
Δf_T at 10.0 VDC ($=f_{10°C} - f_{Tnom}$)	=	-0.09	MHz

Calculate RF Output Power Variation, $\Delta P_V = P_{meas} - P_{10°C}$:

ΔP_V at 9.5 VDC or at 9.5	VDC =	0	dB
ΔP_V at 10.5 VDC or at 10.5	VDC =	0	dB
ΔP_T at 10.0 VDC ($=P_{10°C} - P_{Tnom}$)	=	0.2	dB

Accept ✓ Reject _____

Test Performed by JED Date 03-22-18
Litton Q.A. LITTON Date 4-1-18

TEST DATA SHEET 7.4
FUNCTIONAL PERFORMANCE TESTS
INITIAL DATA SET N/A FINAL DATA SET ✓

LITTON TYPE LS E 9036 AJ/A AESD 1336610- 7
SERIAL NUMBER: 85018 QUAL TEST ✓ ACCEPT TEST —

Temperature Extreme Testing at Tmin. Ref. Test Para. 5.2.5.2

SPECIFICATION	MEASUREMENT AT Tmin ±1°C		LIMIT
Measurement at Vop=10 VDC			
Temperature	1	°C	Table IIIB
Input Voltage	10	VDC	10.0 ± 0.2 VDC
Input Current	192	mA	Table IIIB
Input Power, P_{diss}	1.99	W DC	Pdiss max
Frequency, f_{Tmin}	5494040	GHz	Table IIIB
RF Output Power, P_{Tmin}	12.8	dBm	12 to 17 dBm

Frequency and RF Output Power Variation With Voltage, Ref. Test Para 5.2.5.2

Measurement at 9.5 VDC or at 9.5 VDC			
Temperature	1	°C	Table IIIB
Input Voltage	9.5	VDC	9.5 VDC or Para 5.2.3.2
Input Current	190	mA	Table IIIB
Frequency, f_{meas}	5494040	GHz	Table IIIB
RF Output Power, P_{meas}	12.8	dBm	12 to 17 dBm

Measurement at 10.5 VDC or at 10.5 VDC			
Temperature	1	°C	Table IIIB
Input Voltage	10.5	VDC	10.5 VDC or Para 5.2.3.3
Input Current	190	mA	Table IIIB
Frequency, f_{meas}	5494040	GHz	Table IIIB
RF Output Power, P_{meas}	12.8	dBm	12 to 17 dBm

Calculate Frequency Variation, $\Delta f_V = f_{meas} - f_{Tmin}$:

Δf_V at 9.5 VDC or at 9.5	VDC =	0	MHz
Δf_V at 10.5 VDC or at 10.5	VDC =	0	MHz
Δf_T at 10.0 VDC (=f_{Tmin} -f_{Tnom})		-.28	MHz

Calculate RF Output Power Variation, $\Delta P_V = P_{meas} - P_{Tmin}$:

ΔP_V at 9.5 VDC or at 9.5	VDC =	0	dB
ΔP_V at 10.5 VDC or at 10.5	VDC =	0	dB
ΔP_T at 10.0 VDC (=P_{Tmin} -P_{Tnom})	=	-.4	dB

Accept ✓ Reject ____

Test Performed by JED Date 03-22-98
Litton Q.A. [signature] Date 4-1-98

LITTON
Solid State

TEST DATA SHEET 7.5
FUNCTIONAL PERFORMANCE TESTS
INITIAL DATA SET N/A FINAL DATA SET ✓

LITTON TYPE LS E 9036 AJ1A
SERIAL NUMBER: 85018 QUAL TEST ✓
AESD 1336610- 1
ACCEPT TEST —

Temperature Testing at T=30°C, Ref. Test Para. 5.2.5.3

SPECIFICATION	MEASUREMENT AT T= 30° ±1°C		LIMIT
Measurement at Vop=10 VDC			
Temperature	30	°C	30° ± 1°C
Input Voltage	10	VDC	10.0 ± 0.2 VDC
Input Current	194	mA	Table IIIB
Input Power, P_{diss}	1.94	W DC	Pdiss max
Frequency, $f_{30°C}$	5494070	GHz	Table IIIB
RF Output Power, $P_{30°C}$	12.5	dBm	12 to 17 dBm

Frequency and RF Output Power Variation With Voltage, Ref. Test Para 5.2.5.3

Measurement at 9.5 VDC or at 9.5 VDC			
Temperature	30	°C	Table IIIB
Input Voltage	9.5	VDC	9.5 VDC or Para. 5.2.3.2
Input Current	192	mA	Table IIIB
Frequency, f_{meas}	5494072	GHz	Table IIIB
RF Output Power, P_{meas}	12.5	dBm	12 to 17 dBm

Measurement at 10.5 VDC or at 10.5 VDC			
Temperature	30	°C	Table IIIB
Input Voltage	10.5	VDC	10.5 VDC or Para. 5.2.3.3
Input Current	193	mA	Table IIIB
Frequency, f_{meas}	5494072	GHz	Table IIIB
RF Output Power, P_{meas}	12.4	dBm	12 to 17 dBm

Calculate Frequency Variation, $\Delta f_V = f_{meas} - f_{30°C}$:

Δf_V at 9.5 VDC or at 9.5	VDC =	0.02	MHz
Δf_V at 10.5 VDC or at 10.5	VDC =	0.02	MHz
Δf_T at 10.0 VDC ($=f_{30°C} - f_{Tnom}$)	=	0.04	MHz

Calculate RF Output Power Variation, $\Delta P_V = P_{meas} - P_{30°C}$:

ΔP_V at 9.5 VDC or at 9.5	VDC =	0	dB
ΔP_V at 10.5 VDC or at 10.5	VDC =	-0.1	dB
ΔP_T at 10.0 VDC ($=P_{30°C} - P_{Tnom}$)	=	0.1	dB

Accept ✓ Reject _____

Test Performed by JED Date 03-22-98
Litton Q.A. [signature] Date 4-1-98

LITTON
Solid State

TEST DATA SHEET 7.6
FUNCTIONAL PERFORMANCE TESTS
INITIAL DATA SET N/A FINAL DATA SET ✓

LITTON TYPE LS E 9036 A2/A
SERIAL NUMBER: 85018 QUAL TEST ✓

AESD 1336610- 7
ACCEPT TEST —

Temperature Extreme Testing at Tmax, Ref. Test Para. 5.2.5.4

SPECIFICATION	MEASUREMENT AT Tmax ±1°C		LIMIT
Measurement at Vop=10 VDC			
Temperature	44	°C	Table IIIB
Input Voltage	10	VDC	10.0 ± 0.2 VDC
Input Current	196	mA	Table IIIB
Input Power, P_{diss}	1.96	W DC	Pdiss max
Frequency, f_{Tmax}	5494010	GHz	Table IIIB
RF Output Power, P_{Tmax}	11.9	dBm ✳	12 to 17 dBm

Frequency and RF Output Power Variation With Voltage, Ref. Test Para 5.2.5.4

Measurement at 9.5 VDC or at 9.5 VDC			
Temperature	44	°C	Table IIIB
Input Voltage	9.5	VDC	9.5 VDC or Para 5.2.3.2
Input Current	194	mA	Table IIIB
Frequency, f_{meas}	5494012	GHz	Table IIIB
RF Output Power, P_{meas}	11.9	dBm ✳	12 to 17 dBm
Measurement at 10.5 VDC or at 10.5 VDC			
Temperature	44	°C	Table IIIB
Input Voltage	10.5	VDC	10.5 VDC or Para 5.2.3.3
Input Current	194	mA	Table IIIB
Frequency, f_{meas}	5494014	GHz	Table IIIB
RF Output Power, P_{meas}	11.9	dBm ✳	12 to 17 dBm

Calculate Frequency Variation, $\Delta f_V = f_{meas} - f_{Tmax}$:

Δf_V at 9.5 VDC or at 9.5	VDC =	0.02	MHz
Δf_V at 10.5 VDC or at 10.5	VDC =	0.04	MHz
Δf_T at 10.0V ($=f_{Tmax} - f_{Tnom}$)	=	-0.58	MHz

Calculate RF Output Power Variation, $\Delta P_V = P_{meas} - P_{Tnom}$:

ΔP_V at 9.5 VDC or at 9.5	VDC =	0	dB
ΔP_V at 10.5 VDC or at 10.5	VDC =	0	dB
ΔP_T at 10.0 VDC ($=P_{Tmax} - P_{Tnom}$)	=	-0.5	dB

Accept ✓ Reject ✓

Test Performed by JED Date 03-22-98
Litton Q.A. [signature] Date 4-8-98

SDAR #98-053

CODE IDENT NO.	SIZE	NUMBER	REV	SHEET 42 OF 68
56348	A	1300823	B3	

LITTON
Solid State

TEST DATA SHEET 7.7
FUNCTIONAL PERFORMANCE TESTS
INITIAL DATA SET N/A FINAL DATA SET ✓

LITTON TYPE LS E 9036 AJ/A AESD 1336610- 7
SERIAL NUMBER: 85018 QUAL TEST ✓ ACCEPT TEST N/A

Power Supply Immunity, Ref. Test Para. 5.2.4

SPECIFICATION	MEASUREMENT AT Tnom ±1°C		LIMIT
Initial Measurement			
Temperature	22	°C	Table IIIB
Input Voltage	10	VDC	10.0 ± 0.2 VDC
Input Current	195	mA	Table IIIB
Input Power	1.95	W DC	Pdiss max
Frequency (f_{Tnom})	54.94060	GHz	Table IIIB
RF Output Power	11.8	dBm *	12 to 17 dBm
Frequency Setting Accuracy, Δf_S (= f_{Tnom}-F_o)	0.60	MHz	

Performance After Short Circuit on Power Supply: Ref Test Para 5.2.4.2

Input Voltage	10	VDC	10.0 ± 0.2 VDC
Input Current	195	mA	Table IIIB
Input Power	1.95	W DC	Pdiss max
Frequency	54.94057	GHz	Table IIIB
RF Output Power	11.8	dBm *	12 to 17 dBm

Over Voltage: Ref Test Para 5.2.4.3

Overvoltage Input Voltage	28	VDC	+28V

Performance After Input Overvoltage

Input Voltage	10	VDC	10.0 ± 0.2 VDC
Input Current	195	mA	Table IIIB
Input Power	1.95	W DC	Pdiss max
Frequency	54.94059	GHz	Table IIIB
RF Output Power	11.8	dBm *	12 to 17 dBm

Reverse Polarity: Ref Test Para 5.2.4.4

Reverse Input Voltage	-10	VDC	-10.0 ± 0.2 VDC

Performance After Reverse Input Voltage

Input Voltage	10	VDC	10.0 ± 0.2 VDC
Input Current	195	mA	Table IIIB
Input Power	1.95	W DC	Pdiss max
Frequency, f_{Tnom}	54.94059	GHz	Table IIIB
RF Output Power	11.8	dBm *	12 to 17 dBm
Frequency Setting Accuracy, Δf_S (= f_{Tnom}-F_o)	0.59	MHz	

Accept ✓ Reject ✓ SDAR # 98-053

Test Performed by DH Date 3-24-98
Litton Q.A. [illegible] Date 4-8-98

LITTON
Solid State

TEST DATA SHEET 7.23B
FUNCTIONAL PERFORMANCE TESTS
INITIAL DATA SET N/A FINAL DATA SET ✓

LITTON TYPE LS E 9036 AJ/A
SERIAL NUMBER: 85018 QUAL TEST ✓
AESD 1336610-7
ACCEPT TEST N/A

Frequency Pulling and Load VSWR 2.5:1 max. all phases. Ref Test Para. 5.9

TEST DESCRIPTION		LIMITS
Output Open and Short. Ref. Test Para. 5.9.5		
Temperature	23 °C	24°C ± 5°C
Frequency:	54.94062 GHz	Table IIIB
RF Output Power:	11.8 dBm *	12 to 17 dBm
Input Voltage	10 VDC	10 ± 0.2 VDC
Input Current:	195 mA	Table IIIB
Results:	✓ Acceptable	No Damage or Degradation

Calculate maximum Frequency Accuracy (both positive and negative),
$\Delta f_{acc} = \Delta f_S$ (Use worst-case Δf_S from 7.2, 7.7, and 7.22A) + Δf_H (from 7.22A) + Δf_L (from 7.23A):

Maximum Δf_{acc} =	0.77 MHz (Positive)	Table IIIB
	-0.73 MHz (Negative)	Table IIIB

Calculate maximum Short-term Frequency Stability (both positive and negative).
$\Delta f_{V+T} = \Delta f_V + \Delta f_T$ (Use worst-case Δf_V and Δf_T from 7.2 thru 7.6):

Maximum Δf_{V+T} =	.08 MHz (Positive)	Table IIIB
	-.58 MHz (Negative)	Table IIIB

Calculate maximum overall RF Output Power Stability (both positive and negative),
$\Delta P_{OV} = \Delta P_V + \Delta P_T$ (Use worst-case ΔP_V and ΔP_T from 7.2 thru 7.6) + ΔP_H (from 7.22A) + ΔP_L (from 7.23A):

Maximum ΔP_{OV} =	0.6 dB (Positive)	1.0 dB
	-0.8 dB (Negative)	-1.0 dB

Accept ✓ Reject ✓

SDAR # 98-053

Test Performed by BH Date 3-25-98

Litton Q.A. [signature] Date 4-8-98

CODE IDENT NO.	SIZE	NUMBER	REV	SHEET 61 OF 68
56348	A	1300823	B3	

Channel 8 LO

DRO (P/N: 1336610-8, S/N: 85074)

LITTON
Solid State

TEST DATA SHEET 7.2
FUNCTIONAL PERFORMANCE TESTS
INITIAL DATA SET N/A FINAL DATA SET ✓

LITTON TYPE LSE 9036 AK/A
SERIAL NUMBER: 85074 QUAL TEST ✓ AESD 1336610-8 ACCEPT TEST N/A

Basic Electrical Test; Ref. Test Para. 5.2.2

SPECIFICATION	MEASUREMENT AT Tnom ±1°C		LIMIT
Measurement at Vop=10 VDC			
Temperature	22	°C	Table IIIB
Input Voltage	10	VDC	10.0 ± 0.2 VDC
Input Current	189	mA	Table IIIB
Input Power, P_{diss}	1.89	W DC	P_{diss} max
Frequency, f_{Tnom}	55.50036	GHz	Table IIIB
RF Output Power, P_{Tnom}	12.66	dBm	12 to 17 dBm
Frequency Setting Accuracy, Δf_S (= f_{Tnom}-F_o)	0.36	MHz	

Frequency and RF Output Power Variation With Voltage, Ref. Test Para 5.2.3

Measurement at 9.5 VDC or at 9.5 VDC			
Temperature	22	°C	Table IIIB
Input Voltage	9.5	VDC	9.5 VDC or Para. 5.2.3.2
Input Current	187	mA	Table IIIB
Frequency, f_{meas}	55.50036	GHz	Table IIIB
RF Output Power, P_{meas}	12.66	dBm	12 to 17 dBm
Measurement at 10.5 VDC or at 10.5 VDC			
Temperature	22	°C	Table IIIB
Input Voltage	10.5	VDC	10.5 VDC or Para. 5.2.3.3
Input Current	188	mA	Table IIIB
Frequency, f_{meas}	55.50036	GHz	Table IIIB
RF Output Power, P_{meas}	12.66	dBm	12 to 17 dBm

Calculate Frequency Variation, $\Delta f_V = f_{meas} - f_{Tnom}$,

Δf_V at 9.5 VDC or at 9.5 ✓ VDC = 0 MHz
Δf_V at 10.5 VDC or at 10.5 ✓ VDC = 0 MHz

Calculate RF Output Power Variation, $\Delta P_V = P_{meas} - P_{Tnom}$,

ΔP_V at 9.5 VDC or at 9.5 ✓ VDC = 0 dB
ΔP_V at 10.5 VDC or at 10.5 ✓ VDC = 0 dB

Accept ✓ Reject _____

Test Performed by [signature] Date 4-17-98
Litton QA [signature] Date APR 24 1998

CODE IDENT NO.	SIZE	NUMBER	REV	SHEET 38 OF 68
56348	A	1300823	B3	

LITTON
Solid State

TEST DATA SHEET 7.3
FUNCTIONAL PERFORMANCE TESTS
INITIAL DATA SET N/A FINAL DATA SET ✓

LITTON TYPE LS £ 9036 AK/A AESD 1336610- 8
SERIAL NUMBER: 85074 QUAL TEST ✓ ACCEPT TEST N/A

Temperature Testing at T=10°C, Ref. Test Para. 5.2.5.1

SPECIFICATION	MEASUREMENT AT T=10° ±1°C		LIMIT
Measurement at Vop=10 VDC			
Temperature	11	°C	10° ± 1°C
Input Voltage	10	VDC	10.0 ± 0.2 VDC
Input Current	189	mA	Table IIIB
Input Power, P_{diss}	1.89	W DC	Pdiss max
Frequency, $f_{10°C}$	55.49932	GHz	Table IIIB
RF Output Power, $P_{10°C}$	12.8	dBm	12 to 17 dBm
Frequency and RF Output Power Variation With Voltage, Ref. Test Para 5.2.5.1			
Measurement at 9.5 VDC or at 9.5 VDC			
Temperature	11	°C	Table IIIB
Input Voltage	9.5	VDC	9.5 VDC or Para. 5.2.3.2
Input Current	187	mA	Table IIIB
Frequency, f_{meas}	55.49927	GHz	Table IIIB
RF Output Power, P_{meas}	12.8	dBm	12 to 17 dBm
Measurement at 10.5 VDC or at 10.5 VDC			
Temperature	11	°C	Table IIIB
Input Voltage	10	VDC	10.5 VDC or Para. 5.2.3.3
Input Current	187	mA	Table IIIB
Frequency, f_{meas}	55.49927	GHz	Table IIIB
RF Output Power, P_{meas}	12.8	dBm	12 to 17 dBm

Calculate Frequency Variation, $\Delta f_V = f_{meas} - f_{10°C}$:

Δf_V at 9.5 VDC or at 9.5 ✓	VDC =	-0.05	MHz
Δf_V at 10.5 VDC or at 10.5	VDC =	-0.05	MHz
Δf_T at 10.0 VDC (=$f_{10°C}$ -f_{Tnom})	=	-.96 5 MH	MHz

Calculate RF Output Power Variation. $\Delta P_V = P_{meas} - P_{10°C}$:

ΔP_V at 9.5 VDC or at 9.5V	VDC =	0	dE
ΔP_V at 10.5 VDC or at 10.5V	VDC =	0	dE
ΔP_T at 10.0 VDC (=$P_{10°C}$ -P_{Tnom})	=	0.14	dE

Accept ✓ Reject _____

Test Performed by _____ Date 4-17-98
Litton Q.A. _____ Date APR 2 1 1998

LITTON
Solid State

TEST DATA SHEET 7.4
FUNCTIONAL PERFORMANCE TESTS
INITIAL DATA SET N/A FINAL DATA SET ✓

LITTON TYPE LSE 9036AK/A AESD 1336610- 8
SERIAL NUMBER: 85074 QUAL TEST ✓ ACCEPT TEST N/A

Temperature Extreme Testing at Tmin, Ref. Test Para. 5.2.5.2

SPECIFICATION	MEASUREMENT AT Tmin ±1°C		LIMIT
Measurement at Vop=10 VDC			
Temperature	-2	°C	Table IIIB
Input Voltage	10	VDC	10.0 ± 0.2 VDC
Input Current	188	mA	Table IIIB
Input Power, P_{diss}	1.88	W DC	Pdiss max
Frequency, f_{Tmin}	55.49754	GHz	Table IIIB
RF Output Power, P_{Tmin}	12.86	dBm	12 to 17 dBm

Frequency and RF Output Power Variation With Voltage, Ref. Test Para 5.2.5.2

Measurement at 9.5 VDC or at 9.5 VDC			
Temperature	-2	°C	Table IIIB
Input Voltage	9.5	VDC	9.5 VDC or Para 5.2.3.2
Input Current	186	mA	Table IIIB
Frequency, f_{meas}	55.49754	GHz	Table IIIB
RF Output Power, P_{meas}	12.86	dBm	12 to 17 dBm

Measurement at 10.5 VDC or at 10.5 VDC			
Temperature	-2	°C	Table IIIB
Input Voltage	10.5	VDC	10.5 VDC or Para 5.2.3.3
Input Current	186	mA	Table IIIB
Frequency, f_{meas}	55.49754	GHz	Table IIIB
RF Output Power, P_{meas}	12.86	dBm	12 to 17 dBm

Calculate Frequency Variation, $\Delta f_V = f_{meas} - f_{Tmin}$:

Δf_V at 9.5 VDC or at 9.5	VDC =	0	MHz
Δf_V at 10.5 VDC or at 10.5	VDC =	0	MHz
Δf_T at 10.0 VDC (=f_{Tmin} -f_{Tnom})		-2.82	MHz

Calculate RF Output Power Variation, $\Delta P_V = P_{meas} - P_{Tmin}$:

ΔP_V at 9.5 VDC or at 9.5	VDC =	0	dB
ΔP_V at 10.5 VDC or at 10.5	VDC =	0	dB
ΔP_T at 10.0 VDC (=P_{Tmin} -P_{Tnom})	=	0.2	dB

Accept ✓ Reject _____

Test Performed by [signature] Date 4-17-98
Litton Q.A. [signature] Date APR 24 1998

CODE IDENT NO.	SIZE	NUMBER	REV	SHEET 40 OF 68
56348	A	1300823	B3	

LITTON
Solid State

TEST DATA SHEET 7.5
FUNCTIONAL PERFORMANCE TESTS
INITIAL DATA SET N/A FINAL DATA SET ✓

LITTON TYPE LSE 9036AK/A AESD 1336610- 8
SERIAL NUMBER: 85074 QUAL TEST — ACCEPT TEST —

Temperature Testing at T=30°C, Ref. Test Para. 5.2.5.3

SPECIFICATION	MEASUREMENT AT T=30° ±1°C		LIMIT
Measurement at Vop=10 VDC			
Temperature	30	°C	30° ± 1°C
Input Voltage	10	VDC	10.0 ± 0.2 VDC
Input Current	190	mA	Table IIIB
Input Power, P_{diss}	1.90	W DC	Pdiss max
Frequency, $f_{30°C}$	55.50109	GHz	Table IIIB
RF Output Power, $P_{30°C}$	12.46	dBm	12 to 17 dBm

Frequency and RF Output Power Variation With Voltage, Ref. Test Para 5.2.5.3

Measurement at 9.5 VDC or at 9.5 VDC			
Temperature	30	°C	Table IIIB
Input Voltage	9.5	VDC	9.5 VDC or Para. 5.2.3.2
Input Current	188	mA	Table IIIB
Frequency, f_{meas}	55.50109	GHz	Table IIIB
RF Output Power, P_{meas}	12.46	dBm	12 to 17 dBm

Measurement at 10.5 VDC or at 10.5 VDC			
Temperature	30	°C	Table IIIB
Input Voltage	10.5	VDC	10.5 VDC or Para. 5.2.3.3
Input Current	188	mA	Table IIIB
Frequency, f_{meas}	55.50109	GHz	Table IIIB
RF Output Power, P_{meas}	12.46	dBm	12 to 17 dBm

Calculate Frequency Variation, $\Delta f_V = f_{meas} - f_{30°C}$:

Δf_V at 9.5 VDC or at 9.5	VDC =	0	MHz
Δf_V at 10.5 VDC or at 10.5	VDC =	0	MHz
Δf_T at 10.0 VDC (=$f_{30°C} - f_{Tnom}$)	=	0.73	MHz

Calculate RF Output Power Variation, $\Delta P_V = P_{meas} - P_{30°C}$:

ΔP_V at 9.5 VDC or at 9.5	VDC =	0	dB
ΔP_V at 10.5 VDC or at 10.5	VDC =	0	dB
ΔP_T at 10.0 VDC (=$P_{30°C} - P_{Tnom}$)	=	-0.2	dB

Accept ✓ Reject —

Test Performed by [signature] Date 4-17-98
Litton Q.A. [signature] Date APR 24 1998

CODE IDENT NO.	SIZE	NUMBER	REV	SHEET 41 OF 68
56348	A	1300823	B3	

LITTON
Solid State

TEST DATA SHEET 7.6
FUNCTIONAL PERFORMANCE TESTS
INITIAL DATA SET N/A FINAL DATA SET ✓

LITTON TYPE LS £ 9036 AK/A
SERIAL NUMBER: 85074 QUAL TEST ✓ AESD 1336610- 8
ACCEPT TEST N/A

Temperature Extreme Testing at Tmax, Ref. Test Para. 5.2.5.4

SPECIFICATION	MEASUREMENT AT Tmax ±1°C		LIMIT
Measurement at Vop=10 VDC			
Temperature	43	°C	Table IIIB
Input Voltage	10	VDC	10.0 ± 0.2 VDC
Input Current	191	mA	Table IIIB
Input Power, P_{diss}	1.91	W DC	Pdiss max
Frequency, f_{Tmax}	55.50095	GHz	Table IIIB
RF Output Power, P_{Tmax}	12.26	dBm	12 to 17 dBm

Frequency and RF Output Power Variation With Voltage, Ref. Test Para 5.2.5.4

Measurement at 9.5 VDC or at 9.5 VDC			
Temperature	44	°C	Table IIIB
Input Voltage	9.5	VDC	9.5 VDC or Para 5.2.3.2
Input Current	189	mA	Table IIIB
Frequency, f_{meas}	55.50094	GHz	Table IIIB
RF Output Power, P_{meas}	12.26	dBm	12 to 17 dBm

Measurement at 10.5 VDC or at 10.5 VDC			
Temperature	44	°C	Table IIIB
Input Voltage	10.5	VDC	10.5 VDC or Para 5.2.3.3
Input Current	189	mA	Table IIIB
Frequency, f_{meas}	55.50093	GHz	Table IIIB
RF Output Power, P_{meas}	12.26	dBm	12 to 17 dBm

Calculate Frequency Variation, $\Delta f_V = f_{meas} - f_{Tmax}$:

Δf_V at 9.5 VDC or at 9.5	VDC =	-0.01	MHz
Δf_V at 10.5 VDC or at 10.5	VDC =	-0.02	MHz
Δf_T at 10.0V ($=f_{Tmax} - f_{Tnom}$)	=	0.60	MHz

Calculate RF Output Power Variation, $\Delta P_V = P_{meas} - P_{Tnom}$:

ΔP_V at 9.5 VDC or at 9.5	VDC =	0	dB
ΔP_V at 10.5 VDC or at 10.5	VDC =	0	dB
ΔP_T at 10.0 VDC ($=P_{Tmax} - P_{Tnom}$)	=	-0.4	dB

Accept ✓ Reject _____

Test Performed by _____ Date 4-17-98
Litton Q.A. _____ Date APR 24 1998

CODE IDENT NO.	SIZE	NUMBER	REV	SHEET 42 OF 68
56348	A	1300823	B3	

LITTON
Solid State

TEST DATA SHEET 7.7
FUNCTIONAL PERFORMANCE TESTS
INITIAL DATA SET N/A FINAL DATA SET ✓

LITTON TYPE LS E 9036AK/A AESD 1336610- 8
SERIAL NUMBER: 85074 QUAL TEST ✓ ACCEPT TEST N/A

Power Supply Immunity. Ref. Test Para. 5.2.4

SPECIFICATION	MEASUREMENT AT Tnom ± 1°C		LIMIT
Initial Measurement			
Temperature	21	°C	Table IIIB
Input Voltage	10	VDC	10.0 ± 0.2 VDC
Input Current	189	mA	Table IIIB
Input Power	1.89	W DC	Pdiss max
Frequency (f_{Tnom})	55.50010	GHz	Table IIIB
RF Output Power	12.66	dBm	12 to 17 dBm
Frequency Setting Accuracy, Δf_S (= f_{Tnom}-F_o)	0.10	MHz	

Performance After Short Circuit on Power Supply: Ref Test Para 5.2.4.2

Input Voltage	10	VDC	10.0 ± 0.2 VDC
Input Current	189	mA	Table IIIB
Input Power	1.89	W DC	Pdiss max
Frequency	55.50013	GHz	Table IIIB
RF Output Power	12.66	dBm	12 to 17 dBm

Over Voltage: Ref Test Para 5.2.4.3

Overvoltage Input Voltage	28	VDC	+28V

Performance After Input Overvoltage

Input Voltage	10	VDC	10.0 ± 0.2 VDC
Input Current	189	mA	Table IIIB
Input Power	1.89	W DC	Pdiss max
Frequency	55.50015	GHz	Table IIIB
RF Output Power	12.66	dBm	12 to 17 dBm

Reverse Polarity: Ref Test Para 5.2.4.4

Reverse Input Voltage	-10	VDC	-10.0 ± 0.2 VDC

Performance After Reverse Input Voltage

Input Voltage	10	VDC	10.0 ± 0.2 VDC
Input Current	190	mA	Table IIIB
Input Power	1.90	W DC	Pdiss max
Frequency, f_{Tnom}	55.50015	GHz	Table IIIB
RF Output Power	12.66	dBm	12 to 17 dBm
Frequency Setting Accuracy, Δf_S (= f_{Tnom}-F_o)	0.15	MHz	

Accept ✓ Reject _____

Test Performed by _____ Date 4-17-98
Litton Q.A. _____ Date APR 24 1998

TEST DATA SHEET 7.23B
FUNCTIONAL PERFORMANCE TESTS
INITIAL DATA SET N/A FINAL DATA SET ✓

LITTON TYPE LS E 9036 AK/A AESD 1336610- 8
SERIAL NUMBER: 85074 QUAL TEST ✓ ACCEPT TEST N/A

Frequency Pulling and Load VSWR 2.5:1 max. all phases. Ref Test Para. 5.9

TEST DESCRIPTION			LIMITS
Output Open and Short. Ref. Test Para. 5.9.5			
Temperature	22	°C	24°C ± 5°C
Frequency:	5549970	GHz	Table IIIB
RF Output Power:	12.16	dBm	12 to 17 dBm
Input Voltage	10	VDC	10 ± 0.2 VDC
Input Current:	189	mA	Table IIIB
Results:	✓	Acceptable	No Damage or Degradation

Calculate maximum Frequency Accuracy (both positive and negative),
$\Delta f_{acc} = \Delta f_S$ (Use worst-case Δf_S from 7.2, 7.7, and 7.22A) + Δf_H (from 7.22A) + Δf_L (from 7.23A):

Maximum Δf_{acc} =	0.54	MHz (Positive)	Table IIIB
	0	MHz (Negative)	Table IIIB

Calculate maximum Short-term Frequency Stability (both positive and negative),
$\Delta f_{V+T} = \Delta f_V + \Delta f_T$ (Use worst-case Δf_V and Δf_T from 7.2 thru 7.6):

Maximum Δf_{V+T} =	0.73	MHz (Positive)	Table IIIB
	−2.87	MHz (Negative)	Table IIIB

Calculate maximum overall RF Output Power Stability (both positive and negative),
$\Delta P_{OV} = \Delta P_V + \Delta P_T$ (Use worst-case ΔP_V and ΔP_T from 7.2 thru 7.6) + ΔP_H (from 7.22A) + ΔP_L (from 7.23A):

Maximum ΔP_{OV} =	0.54	dB (Positive)	1.0 dB
	-0.76	dB (Negative)	-1.0 dB

Accept ✓ Reject _____

Test Performed by DH Date 4-21-98

Litton Q.A. LITTON M 60 Date APR 24 1998

CODE IDENT NO.	SIZE	NUMBER	REV	SHEET 61 OF 68
56348	A	1300823	B3	

Channels 9-14 LOs

PLO No. 1 (P/N: 1348360-1, S/N: F04)
TCXO No. 1 (P/N: 1348325-1, S/N: 9702-48695)

PLO N0. 2 (P/N: 1348360-1, S/N: F03)
TCXO No. 2 (P/N: 1348325-1, S/N: 9702-48686)

Report 11172
10 June 1998

Summary of Test Results for AMSU-A Phase Locked Oscillator Testing
Serial Numbers F03 and F04

Paragraph	Description	Requirements	F03	F04
3.2.1.1	Input Voltage and Current	600 mA max, +15V 100 mA max, -15V	521 mA for +15V 66.5 mA for -15V	532 mA for +15V 57.8 mA for -15V
3.2.1.2	Operating Temperature	+1°C to +44°C	-10 to +60°C ***	-30°C to +60°C***
3.2.1.3	Start-up	All loads, -30°C and +60°C; in vacuum	-30°C and +60°C (Ambient pressure)	-30°C and +60°C (Ambient pressure)
3.2.1.4 & 3.2.1.5	Frequency Stability from 57.290344 GHz at 22°C	± 200 kHz	-8 kHz, -20 kHz	-5 kHz, -15 kHz
3.2.1.6	RF Output Power	17 to 20 dBm	18.9 dBm	19.7 dBm
3.2.1.7	Output Power Stability	< 1.5 dB	-0.4 dB +0.6 dB	-0.5 dB, +0.3 dB
3.2.1.8	Load VSWR	2.01:1 or less	Verified	Verified
3.2.1.9	AM Noise	< -130 dBc/Hz @ 1 MHz	-132 dBc/Hz @ 1 MHz -135 dBc/Hz @ >8 MHz*	-132 dBc/Hz @ 1 MHz -136 dBc/Hz @ >8 MHz*
3.2.1.10	FM Noise	< -100 dBc/Hz @ 1 MHz	-103 dBc/Hz @ 1 MHz -128 dBc/Hz @ >8 MHz*	-103 dBc/Hz @ 1MHz -133 dBc/Hz @ >8 MHz*
3.2.1.11	Spurious and Sub Harmonic Signals	< -90 dBc (No Spur in 110 MHz to 400 MHz)	Better than -92 dBc**	Better than -91 dBc**
3.2.1.12	Harmonics	<30 dBc	Below -66 dBc	Below -61 dBc
3.2.1.14	Warm-up time	<30 minutes	Verified	Verified
3.2.1.15	Grounding and Shielding		By Design	By Design
3.2.1.16	Input Voltage Protection		By Design	By Design
3.2.1.17	Reverse Polarity Protection		By Design	By Design
Environmental Testing				
Microphonics		AE-26633	TCXO Test	TCXO Test
Radiation Hardness		AE-26633	By Analysis	By Analysis
EMI/RFI		AE-26633	Not Required	Not Required
Vibration		AE-26633	Acceptance Level	Acceptance Level
Thermal Vacuum		AE-26633	Verified at Ambient pressure only	Verified at Ambient pressure only
Weight		2.00 lbs	2.00 lbs	2.00 lbs

* AMSU-A System Required Frequency
** Spectrum Analyzer Noise Floor = -92 dBm
*** PLO Locable in this range

6BC

TEST DATA SHEET 8 (Sheet 1 of 4)
Functional Testing (Paragraph 4.2.1)

~~Test Setup Verified.~~ STEP Post-Thermal Cycling CPT
~~Signature~~

Paragraph 4.2.1.3, Functional Testing:

Step	Test	Expected	Measured	Pass/Fail
1	Potential Difference from ± 15 V RTN to:			
	PLO Base Plate	< 1.0 Vac	.05V	Pass
	Spectrum Analyzer	< 1.0 Vac	.05V	Pass
	Frequency Counter Chassis	< 1.0 Vac	.04V	Pass
	Power Meter Chassis	< 1.0 Vac	.05V	Pass
4	Evacuate vacuum chamber and record pressure	$<10^{-2}$ torr	Pressure = _____ torr	* Ambient
5	Thermal couple readings	TC1 = 22 ± 2 °C	TC1 = 21.8 °C	Pass
			TC2 = 21.9 °C	N/A
			TC3 = N/A °C	N/A
6	DRO L/A	~~<1V~~ 0 to 1 V	DRO L/A = 67 mV	Pass
	PLO L/A	~~<1V~~ 0 to 1 V	PLO L/A = 71 mV	Pass
	Is PLO locked?	Yes	Yes X	Pass
		.0002 GHz	No _____	
7	PLO Frequency	57.290344 ~~GHz ± 200 kHz~~	Freq. = 57.290 340 400 GHz	Pass
	PLO Power	17 to 20 dBm	P = 19.92 dBm	Pass
8	Input Voltage and Current			
	VM1 Voltage	+15 ± 0.1 V	VM1 = +15.01 V	Pass
	VM2 Voltage	-15 ± 0.1 V	VM2 = -15.05 V	Pass
	IM1 Current	600 mA max.	IM1 = 527 mA	Pass
	IM2 Current	100 mA max.	IM2 = 57.9 mA	Pass
	DRO L/A Voltage	~~<1V~~ 0 to 1 V	DRO L/A = 69 mV	Pass
	PLO L/A Voltage	~~<1V~~ 0 to 1 V	PLO L/A = 73 mV	Pass
12	RF Output Power and	17 to 20 dBm	P = 19.91 dBm	Pass
	Frequency	.0002 GHz		
		57.290344 ~~GHz ± 200 kHz~~	Freq. = 57.290 340 507 GHz	Pass
	Baseplate Temp. (TC1)	TC1 = 22 ±2°C	TC1 = 22.2 °C	Pass
13	Frequency vs. Voltage			
	± 15 V Supplies	+15.2 ± 0.05 V	+Voltage = 15.21 V	Pass
		-15.2 ± 0.05 V	-Voltage = -15.19 V	Pass
		.0002 GHz		
		57.290344 ~~GHz ± 200 kHz~~	Freq. = 57.290 340 562 GHz	Pass
		17 to 20 dBm	P = 19.91 dBm	Pass

* Record data only if performing test under vacuum

68C
TEST DATA SHEET 8 (Sheet 2 of 4)
Functional Testing (Paragraph 4.2.1)

Post Thermal Cycling CPT

Paragraph 4.2.1.3 (Cont):

Step	Test	Expected	Measured	Pass/Fail
14	Frequency vs. Voltage			
	± 15 V Supplies	+14.8 ± 0.05 V	+Voltage = 14.80 V	Pass
		-14.8 ± 0.05 V .0002 GHz	-Voltage = -14.91 V	Pass
		57.290344 ~~GHz ± 200 kHz~~	Freq. = 57.290 340 557 GHz	Pass
		17 to 20 dBm	P = 19.12 dBm	Pass
15	Spurious and Sub	-200 to -90 dBc	See 16b's	Pass
16	Power level of 114.58 GHz signal	<-10 dBm	~~Power of 114.58 GHz =~~ -64 dBm	Pass
17	Load VSWR and Frequency Pulling			
	2:1 mismatch over 1λ	N/A	Worst Case Freq = 1 Hz	N/A
	2:1 mismatch over 1λ	N/A	Worst Case Power = .25 dB Peak	N/A
18	Operating Temperature @ 1°C baseplate	TC1 = 1 ±2°C	TC1 = 1.5°C	Pass
			TC2 = 1.9°C	N/A
			TC3 = 1.0°C	N/A
		0 - 1V	DRO L/A = 60 mV	Pass
		0 - 1V	PLO L/A = 66 mV	Pass
19	Input Voltage and Current			
	VM1 Voltage	+15 ± 0.1 V	VM1 = +15.0 V	Pass
	VM2 Voltage	-15 ± 0.1 V	VM2 = -15.0 V	Pass
	IM1 Current	600 mA max.	IM1 = 515 mA	Pass
	IM2 Current	100 mA max.	IM2 = 56.6 mA	Pass
	DRO L/A Voltage	~~<1V~~ 0 to 1	DRO L/A = 60 mV	Pass
	PLO L/A Voltage	~~<1V~~ 0 to 1	PLO L/A = 66 mV	Pass
	RF Output Power	17 to 20 dBm .0002 GHz	Power = ~~20.08~~ dBm 20 mW	Pass
	Frequency	57.290344 ~~GHz ± 200 kHz~~	Freq. = 57.290 326 915 GHz	Pass
	Frequency vs. Voltage			
	± 15 V Supplies	+15.2 ± 0.05 V	+Voltage = +15.2 V	Pass
		-15.2 ± 0.05 V .0002 GHz	-Voltage = -15.2 V	Pass
		57.290344 ~~GHz ± 200 kHz~~	Freq. = 57.290326 9 GHz	Pass
		17 to 20 dBm	Power = ~~20.08~~ dBm 20 mW	Pass
	Frequency vs. Voltage			
	± 15 V Supplies	+14.8 ± 0.05 V	+Voltage = 14.9 V	Pass
		-14.8 ± 0.05 V .0002 GHz	-Voltage = -14.9 V	Pass
		57.290344 ~~GHz ± 200 kHz~~	Freq. = 57.290 326 9 GHz	Pass
		17 to 20 dBm	Power = ~~20.08~~ dBm 20 mW	Pass

68C

TEST DATA SHEET 6 (Sheet 3 of 4)
Functional Testing (Paragraph 4.2.1)

Post Thermal Cycling CPT

Paragraph 4.2.1.3 (Cont):

Step	Test	Expected	Measured	Pass/Fail
19 (Cont)	Spurious and Sub	-200 to -90 dBc	See Plots	Pass
	Power level of 114.58 GHz signal	<-10 dBm	~~Power of 114.58 GHz =~~ -66 dBm	Pass
	Load VSWR and Frequency Pulling			
	2:1 mismatch over 1λ	N/A	Worst Case Freq = 3 Hz	N/A
	2:1 mismatch over 1λ	N/A	Worst Case Power = .36 dB Peak	N/A
21	Operating Temperature @ +44°C Baseplate	TC1 = 44 ±2°C	TC1 = 45.0	Pass
			TC2 = 45.6	N/A
			TC3 = 44.7	N/A
		0 - 1V	DRO L/A = .120 V	Pass
		0 - 1V	PLO L/A = .109 V	Pass
22	Input Voltage and Current			
	VM1 Voltage	+15 ± 0.1 V	VM1 = +15.0 V	Pass
	VM2 Voltage	-15 ± 0.1 V	VM2 = -15.0 V	Pass
	IM1 Current	600 mA max.	IM1 = 541 mA	Pass
	IM2 Current	100 mA max.	IM2 = 59.4 mA	Pass
	DRO L/A Voltage	~~<1V~~ 0 to 1 V	DRO L/A = .120 V	Pass
	PLO L/A Voltage	~~<1V~~ 0 to 1 V	PLO L/A = .109 V	Pass
	RF Output Power and	17 to 20 dBm .0002 GHz	Power = 20 dBm	Pass
	Frequency	57.290344 ~~GHz~~ ± ~~200 kHz~~	Freq. = 57.290 337 GHz	Pass
	Frequency vs. Voltage			
	± 15 V Supplies	+15.2 ± 0.05 V	+Voltage = 15.2 V	Pass
		-15.2 ± 0.05 V .0002 GHz	-Voltage = -15.2 V	Pass
		57.290344 ~~GHz~~ ± 200 ~~kHz~~	Freq. = 57.290 337 GHz	Pass
		17 to 20 dBm	Power = 20 dBm	Pass
	Frequency vs. Voltage			
	± 15 V Supplies	+14.8 ± 0.05 V	+Voltage = 14.8 V	Pass
		-14.8 ± 0.05 V .0002 GHz	-Voltage = -14.8 V	Pass
		57.290344 ~~GHz~~ ± ~~200 kHz~~	Freq. = 57.290 337 GHz	Pass
		17 to 20 dBm	Power = 20 dBm	Pass

68C
TEST DATA SHEET 6 (Sheet 4 of 4)
Functional Testing (Paragraph 4.2.1)

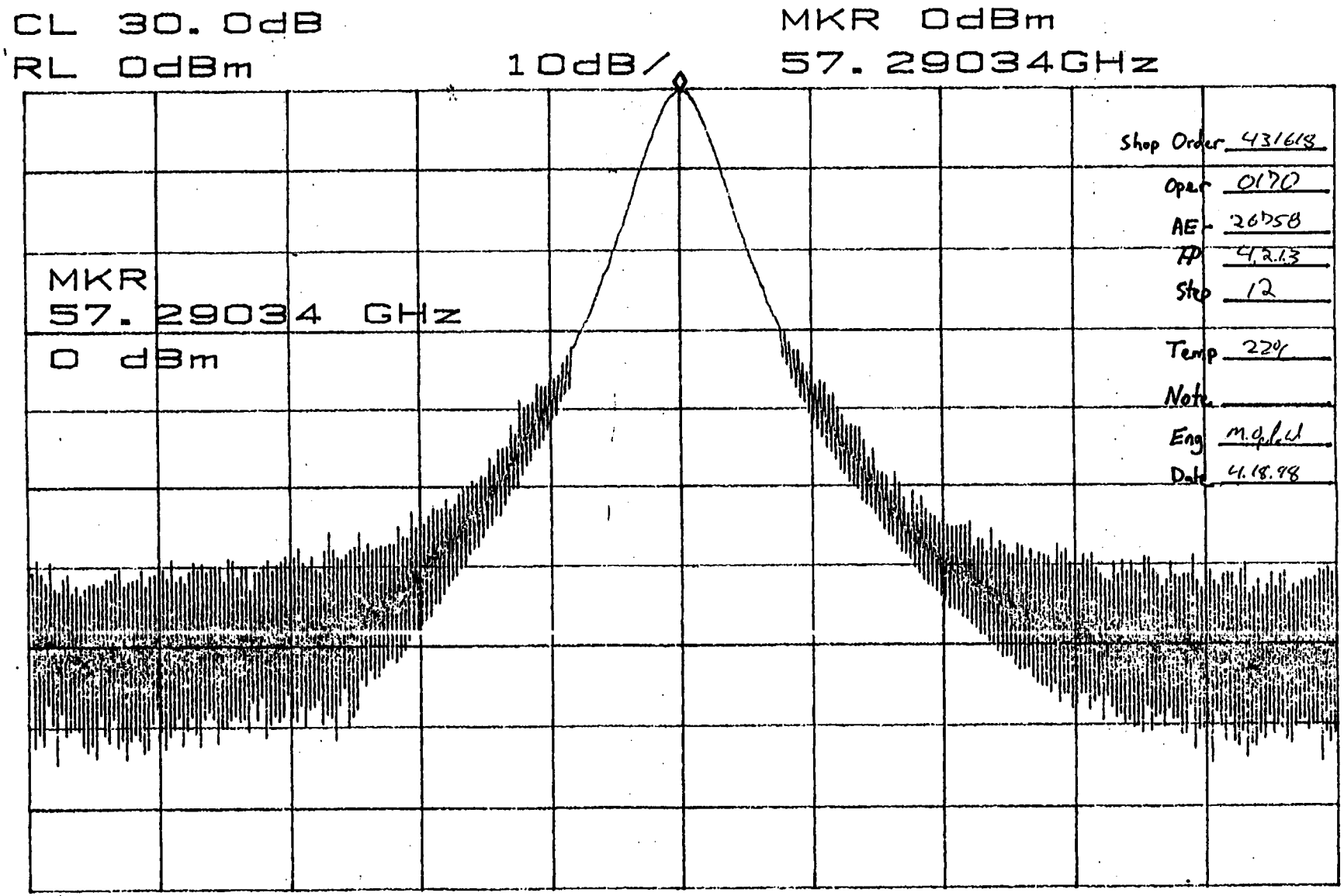
Post Thermal Cycling CAT

Paragraph 4.2.1.3 (Cont):

Step	Test	Expected	Measured	Pass/Fail
22 (Cont)	Spurious and Sub	-200 to -90 dBc	See data	Pass
	Power level of 114.58 GHz signal	<-10 dBm	~~Power of 114.58 GHz =~~ -27 dBm	Pass
	Load VSWR and Frequency Pulling			
	2:1 mismatch over 1λ	N/A	Worst Case Freq = 5 Hz	N/A
	2:1 mismatch over 1λ	N/A	Worst Case Power = .42 dB Peak	N/A

Shop Order No.: 431615
operation : 020
Unit Serial No.: F03
Date: 4.18.98

Test Engineer: M. Schell
Control TA 190 APR 20
Quality ~~Assurance~~:
Govt. Rep. 4/20/98
~~DCMC~~:


CL 30.0dB
RL 0dBm
10dB/
MKR 0dBm
57.29034GHz
MKR
57.29034 GHz
0 dBm
Shop Order 431618
Oper 0170
AE 26058
AP 4.2.13
Step 12
Temp 22°
Note
Eng M.Q.L.U
Date 4.18.98
CENTER 57.29034GHz
SPAN 10.00MHz
*RBW 300kHz
*VBW 300kHz
SWP 50.0ms

7A 190 4/20/98

S/N 9702-04695

4.5 FINAL FUNCTIONAL TESTS

PARA	TEST	SPECIFICATION	+20°C
5.1	**Electronic Tuning Range**		
	Resistance w/fo+375Hz	0Ω to 100kΩ	6542 Ω
	Resistance w/fo-375Hz	0Ω to 100kΩ	13755 Ω
5.2	**Frequency Settability**		
	Frequency Setting	143.22586MHz±71.6Hz	143225875 Hz
	Resistor Value	0 to 100kΩ	10,000 Ω
5.3	**Output Frequency**	fo±143.2Hz	143225877 Hz
5.4	**Input Current**	≤ 70 mA	35.76 mA
5.5	**RF Output Power**		
	RF Output Power	+15dBm±1dB	14.67 dBm
5.6	**Frequency and Output Power Stability**		
5.6.2	**Frequency and Output Power vs Voltage**		
step b	Frequency w/Vin=12.00Vdc	fo	143225877 Hz
	Power w/Vin=12.00Vdc	+15dBm±1dB (Po)	14.67 dBm
	Frequency w/Vin=12.12Vdc	fo ± 28.6Hz	143225861 Hz
	Power w/Vin=12.12Vdc	Po ± 0.5dB	14.77 dBm
	Frequency w/Vin=11.88Vdc	fo ± 28.6Hz	143225894 Hz
	Power w/Vin=11.88Vdc	Po ± 0.5dB	14.57 dBm
5.6.4	**Frequency Pulling**		
step a	Freq. w/Load VSWR = 1:1 @ 0°		143225877 Hz
step b	Freq. w/Load VSWR = 2:1 @ 0°		143225876 Hz
step c	Freq. w/Load VSWR = 1:1 @ 180°		143225873 Hz
	Freq. w/Load VSWR = 1:1 @ 90°		143825877 Hz
	Freq. w/Load VSWR = 1:1 @ 45°		143225876 Hz
	Max. ΔFreq. from step a to c	≤ 14.3Hz	4 Hz
5.7	**Harmonics and Spurious**		
	Harmonics	≤ -70dBc	-71 dBc
	Spurious and Subharmonics	≤ -85dBc	<-85 dBc

TESTED BY: Tom Solomon
DATE: 6/13/97

CODE IDENT NO.	DRAWING NO.	REV
14844	A 75519 — 14014	B
FREQUENCY ELECTRONICS, INC.		SHEET 11

A7905-FOR (7/86)

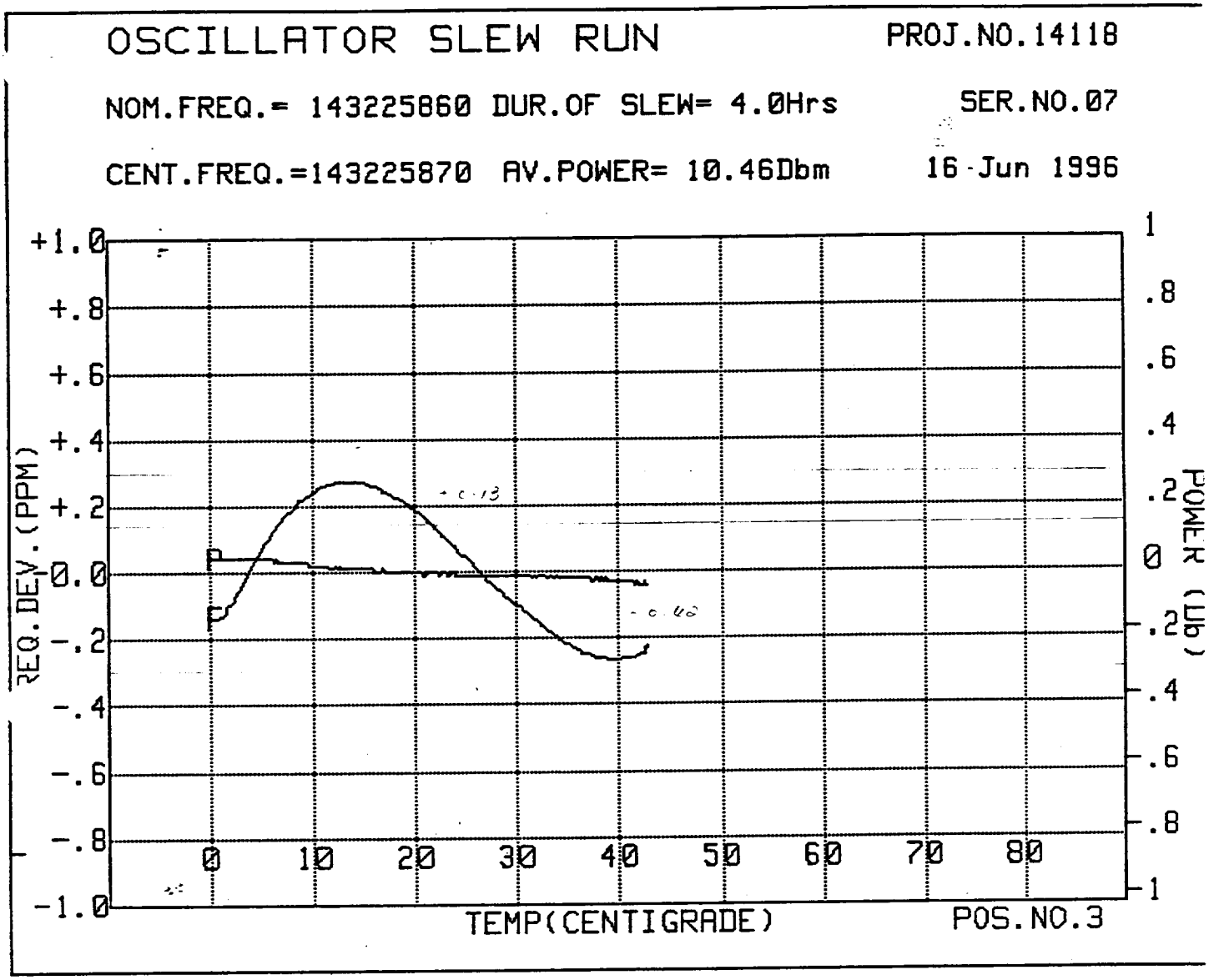
PARA	TEST	SPECIFICATION	4.5 FINAL FUNCTIONAL TESTS +20°C
5.8	**Phase Noise @:**		
	100Hz	≤-80dBc	-112 dBc
	1kHz	≤-115dBc	-135 dBc
	10kHz	≤-120dBc	-145 dBc
	100kHz	≤-125dBc	-145 dBc
	1MHz	≤-130dBc	-144 dBc
	Attach Plot		✓ (√)
5.9	**AM Noise @:**		
	100Hz	≤-105dBc	-130 dBc
	1kHz	≤-125dBc	-132 dBc
	10kHz	≤-130dBc	-148 dBc
	100kHz	≤-135dBc	-157 dBc
	1MHz	≤-140dBc	-153 dBc
	Attach Plot		✓ (√)
5.10	**Short Term Stability**	±0.1ppm	.001 ppm
5.6.1	**Frequency vs Temperature**		
	Frequency Δ from -30°C to -1°C	±2005Hz	1144 Hz
	Frequency Δ from +42°C to +60°C	±2005Hz	286 Hz
	Frequency Δ from -1°C to +42°C	±143.2Hz	71.5 Hz
	Power Δ from -1°C to +42°C	±1 dB	0.05 dB
	Power Δ from -30°C to +60°C	+13dBm (min)	~~8.3~~ dBm 14.52 P.P.
5.6.3	**Frequency and Power Hysteresis**		
	Frequency Hysteresis @ +20°C	±0.3 ppm	.02 ppm
	Power Hysteresis @ +20°C	±0.25dB	.1 dB
	Attach Plot		✓ (√)

TESTED BY: [signature]

DATE: 6/19/92

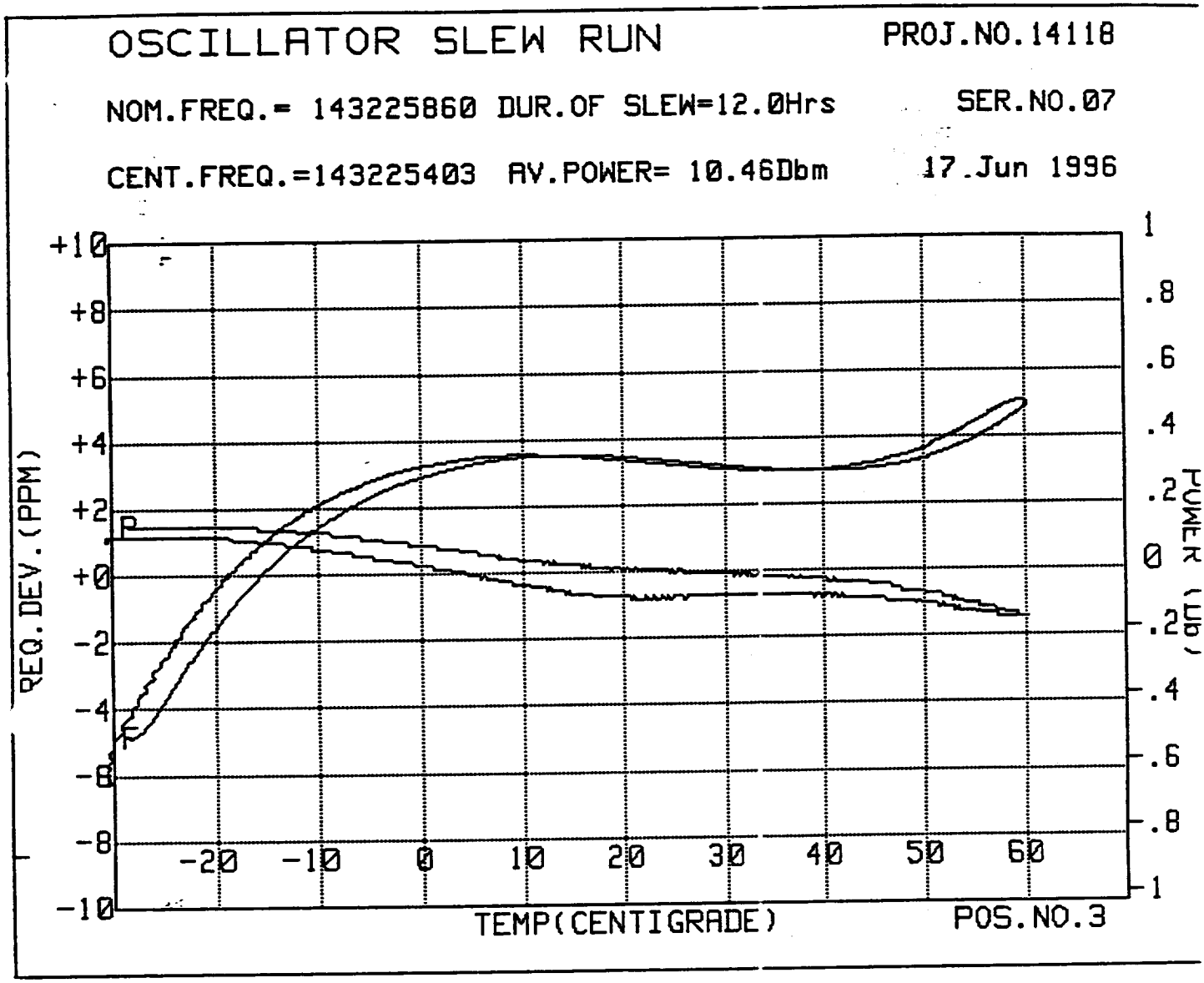
CODE IDENT NO.	DRAWING NO.	REV
14844	A 75519 — 14014	B
FREQUENCY ELECTRONICS, INC.		SHEET 12

A1905-FOR (7/86)



FINAL FUNCTIONAL

5.6.1



FINAL FUNCTIONAL

5.6.3

6B C

TEST DATA SHEET 8 (Sheet 1 of 4)
Functional Testing (Paragraph 4.2.1)

~~Test Setup Verified:~~ STET Post-Thermal Cycling CPT
~~Signature~~

Paragraph 4.2.1.3, Functional Testing:

Step	Test	Expected	Measured	Pass/Fail
1	Potential Difference from ± 15 V RTN to:			
	PLO Base Plate	< 1.0 Vac	.05V	PASS
	Spectrum Analyzer	< 1.0 Vac	.05V	PASS
	Frequency Counter Chassis	< 1.0 Vac	.04V	PASS
	Power Meter Chassis	< 1.0 Vac	.05V	PASS
4	Evacuate vacuum chamber and record pressure	$<10^{-2}$ torr	Pressure = _____ torr	* Ambient
5	Thermal couple readings	TC1 = 22 ± 2 °C	TC1 = 21.9 °C	Pass
			TC2 = 21.9 °C	N/A
			TC3 = 21.9 °C	N/A
6	DRO L/A	~~<1V~~ 0 to 1 V	DRO L/A = 57 mV	Pass
	PLO L/A	~~<1V~~ 0 to 1 V	PLO L/A = 5.7V	Pass
	Is PLO locked?	Yes	Yes X No _____	Pass
7	PLO Frequency	57.290344 ~~GHz ± 200 kHz~~ .0002 GHz	Freq. = 57.290 334 999 GHz	Pass
	PLO Power	17 to 20 dBm	P = 19.96 dBm	Pass
8	Input Voltage and Current			
	VM1 Voltage	+15 ± 0.1 V	VM1 = 15.03 V	Pass
	VM2 Voltage	-15 ± 0.1 V	VM2 = -15.09 V	Pass
	IM1 Current	600 mA max.	IM1 = 521 mA	Pass
	IM2 Current	100 mA max.	IM2 = 66.6 mA	Pass
	DRO L/A Voltage	~~<1V~~ 0 to 1 V	DRO L/A = 56 mV	Pass
	PLO L/A Voltage	~~<1V~~ 0 to 1 V	PLO L/A = 54 mV	Pass
12	RF Output Power and Frequency	17 to 20 dBm .0002 GHz	P = 18.96 dBm	Pass
		57.290344 ~~GHz ± 200 kHz~~	Freq. = 57.290 385 021 GHz	Pass
	Baseplate Temp. (TC1)	TC1 = 22 ±2°C	TC1 = 22.1°C	Pass
13	Frequency vs. Voltage			
	± 15 V Supplies	+15.2 ± 0.05 V	+Voltage = +15.23 V	Pass
		-15.2 ± 0.05 V .0002 GHz	-Voltage = -15.20 V	Pass
		57.290344 ~~GHz ± 200 kHz~~	Freq. = 57.290 33625 GHz	Pass
		17 to 20 dBm	P = 19.96 dBm	Pass

* Record data only if performing test under vacuum

68C
TEST DATA SHEET 8 (Sheet 2 of 4)
Functional Testing (Paragraph 4.2.1)

Post Thermal Cycling CPT

Paragraph 4.2.1.3 (Cont):

Step	Test	Expected	Measured	Pass/Fail
14	Frequency vs. Voltage			
	± 15 V Supplies	+14.8 ± 0.05 V	+Voltage = 14.83 V	Pass
		-14.8 ± 0.05 V .0002 GHz	-Voltage = -14.81 V	Pass
		57.290344 ~~GHz ± 200 kHz~~	Freq. = 57.290336 19 GHz	Pass
		17 to 20 dBm	P = 19.94 dBm	Pass
15	Spurious and Sub	-200 to -90 dBc	See plots	Pass
16	Power level of 114.58 GHz signal	<-10 dBm	~~Power of 114.58 GHz =~~ -24 dBm	Pass
17	Load VSWR and Frequency Pulling			
	2:1 mismatch over 1λ	N/A	Worst Case Freq = 1 Hz	N/A
	2:1 mismatch over 1λ	N/A	Worst Case Power = .33 dB Peak	N/A
18	Operating Temperature @ 1°C baseplate	TC1 = 1 ±2°C	TC1 = 1.1°C	Pass
			TC2 = 1.6°C	N/A
			TC3 = 0.9°C	N/A
		0 - 1V	DRO L/A = 48 mV	Pass
		0 - 1V	PLO L/A = 48 mV	Pass
19	Input Voltage and Current			
	VM1 Voltage	+15 ± 0.1 V	VM1 = +15.0 V	Pass
	VM2 Voltage	-15 ± 0.1 V	VM2 = -15.0 V	Pass
	IM1 Current	600 mA max.	IM1 = 507 mA	Pass
	IM2 Current	100 mA max.	IM2 = 14.6 mA	Pass
	DRO L/A Voltage	~~<1V~~ 0 to 1	DRO L/A = 48 mV	Pass
	PLO L/A Voltage	~~≤1V~~ 0 to 1	PLO L/A = 48 mV	Pass
	RF Output Power	17 to 20 dBm .0002 GHz	Power = 19.51 dBm	Pass
	Frequency	57.290344 ~~GHz ± 200 kHz~~	Freq. = 57 290 334 7 GHz	Pass
	Frequency vs. Voltage			
	± 15 V Supplies	+15.2 ± 0.05 V	+Voltage = 15.2 V	Pass
		-15.2 ± 0.05 V .0002 GHz	-Voltage = -15.2 V	Pass
		57.290344 ~~GHz ± 200 kHz~~	Freq. = 57.290 334 6 GHz	Pass
		17 to 20 dBm	Power = 19.51 dBm	Pass
	Frequency vs. Voltage			
	± 15 V Supplies	+14.8 ± 0.05 V	+Voltage = 14.8 V	Pass
		-14.8 ± 0.05 V .0002 GHz	-Voltage = -14.8 V	Pass
		57.290344 ~~GHz ± 200 kHz~~	Freq. = 57.290334 7 GHz	Pass
		17 to 20 dBm	Power = 19.51 dBm	

AE-26758A
21 Jan 98

6BC

TEST DATA SHEET 6 (Sheet 3 of 4)
Functional Testing (Paragraph 4.2.1)

Post Thermal Cycling CPT

Paragraph 4.2.1.3 (Cont):

Step	Test	Expected	Measured	Pass/Fail
19 (Cont)	Spurious and Sub	-200 to -90 dBc	See Plots	
	Power level of 114.58 GHz signal	<-10 dBm	~~Power of 114.58 GHz =~~ -77 dBm	Pass
	Load VSWR and Frequency Pulling			
	2:1 mismatch over 1λ	N/A	Worst Case Freq = 10 Hz	N/A
	2:1 mismatch over 1λ	N/A	Worst Case Power = .29 dB Peak	N/A
21	Operating Temperature @ +44°C Baseplate	TC1 = 44 ±2°C	TC1 = 43.9°C	Pass
			TC2 = 44.5°C	N/A
			TC3 = 44.1°C	N/A
		0 - 1V	DRO L/A = .101 V	Pass
		0 - 1V	PLO L/A = .093 V	Pass
22	Input Voltage and Current			
	VM1 Voltage	+15 ± 0.1 V	VM1 = 15.0 V	Pass
	VM2 Voltage	-15 ± 0.1 V	VM2 = -15.0 V	Pass
	IM1 Current	600 mA max.	IM1 = 532 mA	Pass
	IM2 Current	100 mA max.	IM2 = 68 mA	Pass
	DRO L/A Voltage	~~<1V~~ 0 to 1 V	DRO L/A = .101 V	Pass
	PLO L/A Voltage	~~<1V~~ 0 to 1 V	PLO L/A = .093 V	Pass
	RF Output Power and	17 to 20 dBm .0002 GHz	Power = 18.15 dBm	
	Frequency	57.290344 ~~GHz~~ ± ~~200 kHz~~	Freq. = 57.290326 60 GHz	Pass
	Frequency vs. Voltage			
	± 15 V Supplies	+15.2 ± 0.05 V	+Voltage = 15.2 V	Pass
		-15.2 ± 0.05 V .0002 GHz	-Voltage = -15.2 V	Pass
		57.290344 ~~GHz~~ ± ~~200 kHz~~	Freq. = 57.29032660 GHz	
		17 to 20 dBm	Power = 18.13 dBm	
	Frequency vs. Voltage			
	± 15 V Supplies	+14.8 ± 0.05 V	+Voltage = 14.8 V	Pass
		-14.8 ± 0.05 V .0002 GHz	-Voltage = -14.8 V	Pass
		57.290344 ~~GHz~~ ± ~~200 kHz~~	Freq. = 57.29032660 GHz	PASS
		17 to 20 dBm	Power = 18.14 dBm	PASS

68C

TEST DATA SHEET 8 (Sheet 4 of 4)
Functional Testing (Paragraph 4.2.1)

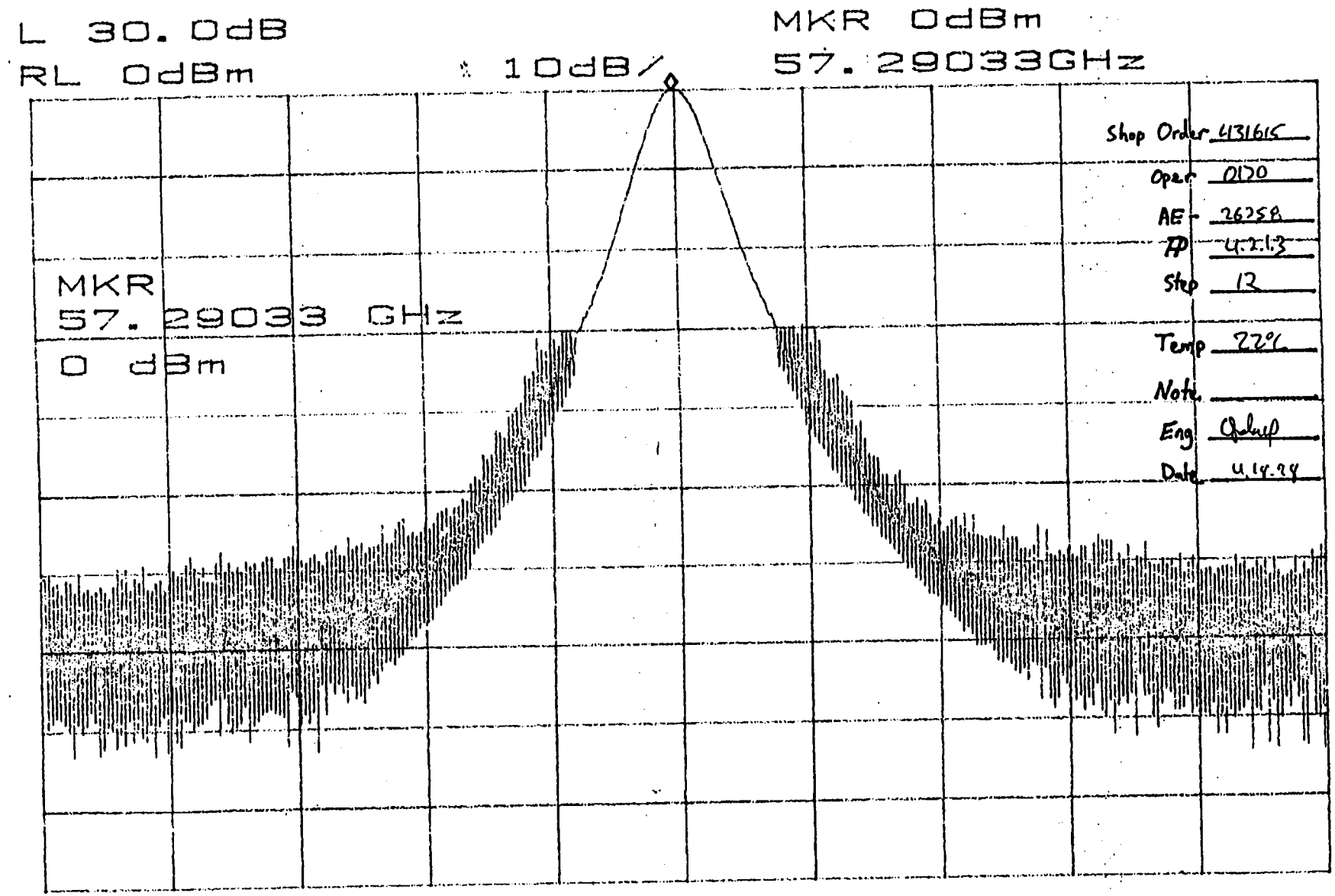
Post Thermal Cycling CAT

Paragraph 4.2.1.3 (Cont):

Step	Test	Expected	Measured	Pass/Fail
22 (Cont)	Spurious and Sub	-200 to -90 dBc	See plots	Pass
	Power level of 114.58 GHz signal	<-10 dBm	~~Power of 114.58 GHz =~~ _____ dBm	Pass
	Load VSWR and Frequency Pulling			
	2:1 mismatch over 1λ	N/A	Worst Case Freq = 5 Hz	N/A
	2:1 mismatch over 1λ	N/A	Worst Case Power = .72 dB Pk	N/A

Shop Order No.: 431615
Operation: 2170
Unit Serial No.: 504
Date: 4.18.98

Test Engineer: Mark Odahl
Quality ~~Assurance~~ Control 4/20/98 (7A 190)
Govt. Rep. 7-30-98
~~DCMC~~:


L 30.0dB
RL 0dBm
* 10dB/
MKR 0dBm
57.29033GHz
MKR
57.29033 GHz
0 dBm
Shop Order 431615
Oper 0120
AE 26258
FP 4.2.1.3
Step 13
Temp 22°C
Note
Eng Ophelp
Date 4.14.94
CENTER 57.29034GHz
SPAN 10.00MHz
*RBW 300kHz
*VBW 300kHz
SWP 50.0ms

S/N 9702-KB6B6

PARA	TEST	SPECIFICATION	4.5 FINAL FUNCTIONAL TESTS +20°C
5.1	**Electronic Tuning Range**		
	Resistance w/fo+375Hz	0Ω to 100kΩ	3.3K Ω
	Resistance w/fo-375Hz	0Ω to 100kΩ	9.1K Ω
5.2	**Frequency Settability**		
	Frequency Setting	143.22586MHz±71.6Hz	143,225,845 Hz
	Resistor Value	0 to 100kΩ	6.2K Ω
5.3	**Output Frequency**		
		fo±143.2Hz	143,225,847 Hz
5.4	**Input Current**		
		≤ 70 mA	50.35 mA
5.5	**RF Output Power**		
	RF Output Power	+15dBm±1dB	15.51 dBm
5.6	**Frequency and Output Power Stability**		
5.6.2	**Frequency and Output Power vs Voltage**		
step b	Frequency w/Vin=12.00Vdc	to	143,225,846 Hz
	Power w/Vin=12.00Vdc	+15dBm±1dB (Po)	15.51 dBm
	Frequency w/Vin=12.12Vdc	fo ± 28.6Hz	143,225,848 Hz
	Power w/Vin=12.12Vdc	Po ± 0.5dB	15.62 dBm
	Frequency w/Vin=11.88Vdc	fo ± 28.6Hz	143,225,841 Hz
	Power w/Vin=11.88Vdc	Po ± 0.5dB	15.28 dBm
5.6.4	**Frequency Pulling**		
step a	Freq. w/Load VSWR = 1:1 @ 0°		143,225,846 Hz
step b	Freq. w/Load VSWR = 2:1 @ 0°		143,225,845 Hz
step c	Freq. w/Load VSWR = 1:1 @ 180°		143,225,846 Hz
	Freq. w/Load VSWR = 1:1 @ 90°		143,225,846 Hz
	Freq. w/Load VSWR = 1:1 @ 45°		143,225,845 Hz
	Max. ΔFreq. from step a to c	≤ 14.3Hz	1.0 Hz
5.7	**Harmonics and Spurious**		
	Harmonics	≤ -70dBc	<-70 dBc
	Spurious and Subharmonics	≤ -85dBc	<-85 dBc

TESTED BY: JL

DATE: 1/9/97

CODE IDENT NO.	DRAWING NO.	REV
14844	A 75519 — 14014	B

FREQUENCY ELECTRONICS, INC. SHEET 11

A1905-TOR (7/86)

PARA	TEST	SPECIFICATION	4.5 FINAL FUNCTIONAL TESTS +20°C
5.8	**Phase Noise @:**		
	100Hz	≤ -80dBc	−118 dBc
	1kHz	≤ -115dBc	−130 dBc
	10kHz	≤ -120dBc	−145 dBc
	100kHz	≤ -125dBc	−146 dBc
	1MHz	≤ -130dBc	−145 dBc
	Attach Plot		✓ (√)
5.9	**AM Noise @:**		
	100Hz	≤ -105dBc	−126 dBc
	1kHz	≤ -125dBc	−136 dBc
	10kHz	≤ -130dBc	−146 dBc
	100kHz	≤ -135dBc	−153 dBc
	1MHz	≤ -140dBc	−152 dBc
	Attach Plot		✓ (√)
5.10	**Short Term Stability**		
		±0.1ppm	0.005 ppm
5.6.1	**Frequency vs Temperature**		
	Frequency Δ from -30°C to -1°C	±2005Hz	859 Hz
	Frequency Δ from +42°C to +60°C	±2005Hz	358 Hz
	Frequency Δ from -1°C to +42°C	±143.2Hz	573 Hz
	Power Δ from -1°C to +42°C	±1dB	0.4 dB
	Power Δ from -30°C to +60°C	+13dBm (min)	15.11 dBm
5.6.3	**Frequency and Power Hysteresis**		
	Frequency Hysteresis @ +20°C	±0.3 ppm	0.0 ppm
	Power Hysteresis @ +20°C	±0.25dB	<0.1 dB
	Attach Plot		✓ (√)

TESTED BY: [signature]

DATE: 1/9/97

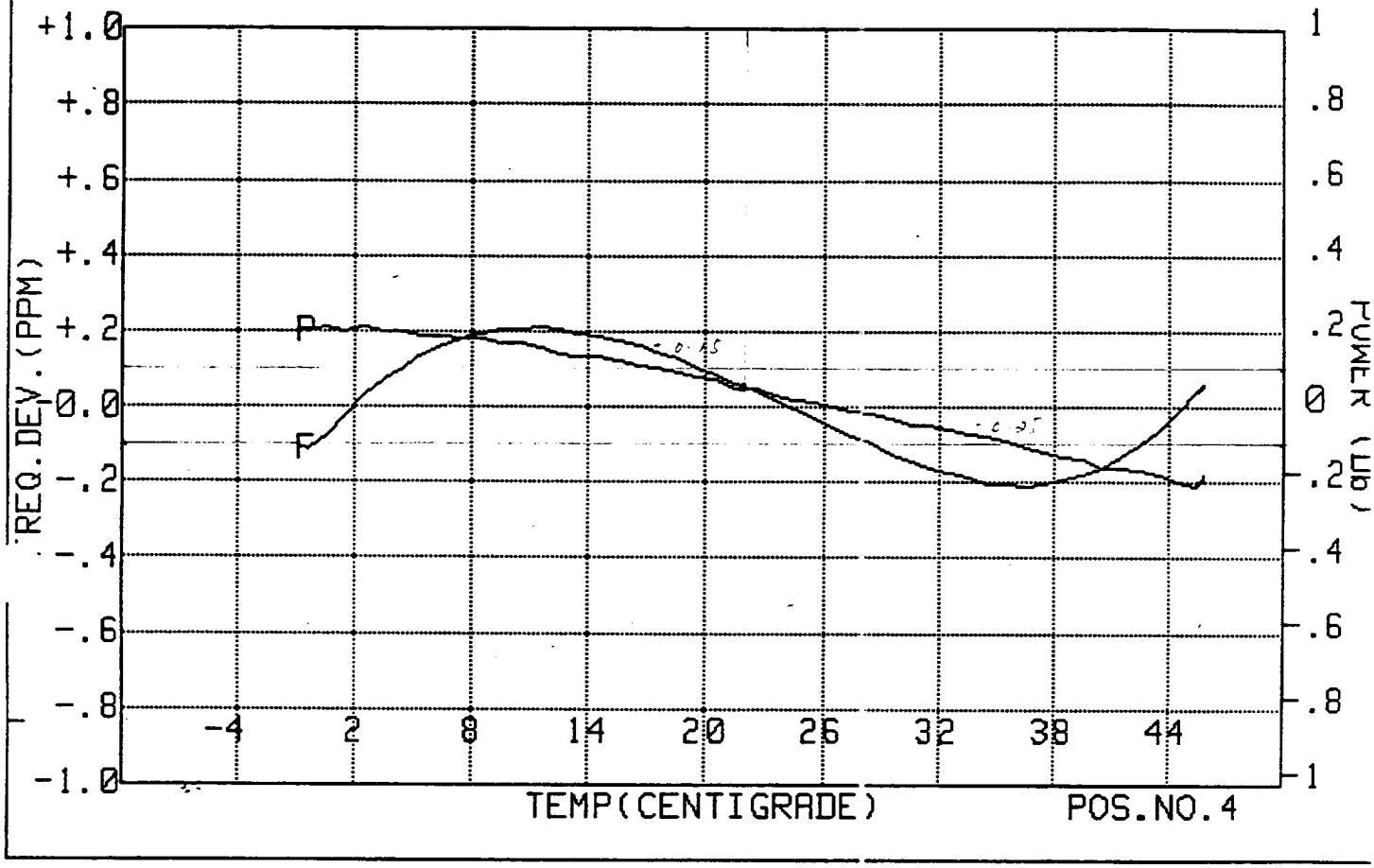
CODE IDENT NO.	DRAWING NO.	REV
14844	A 75519 — 14014	B

FREQUENCY ELECTRONICS, INC. SHEET 12

OSCILLATOR SLEW RUN PROJ.NO.14118

NOM.FREQ.= 143225860 DUR.OF SLEW= 8.0Hrs SER.NO.11

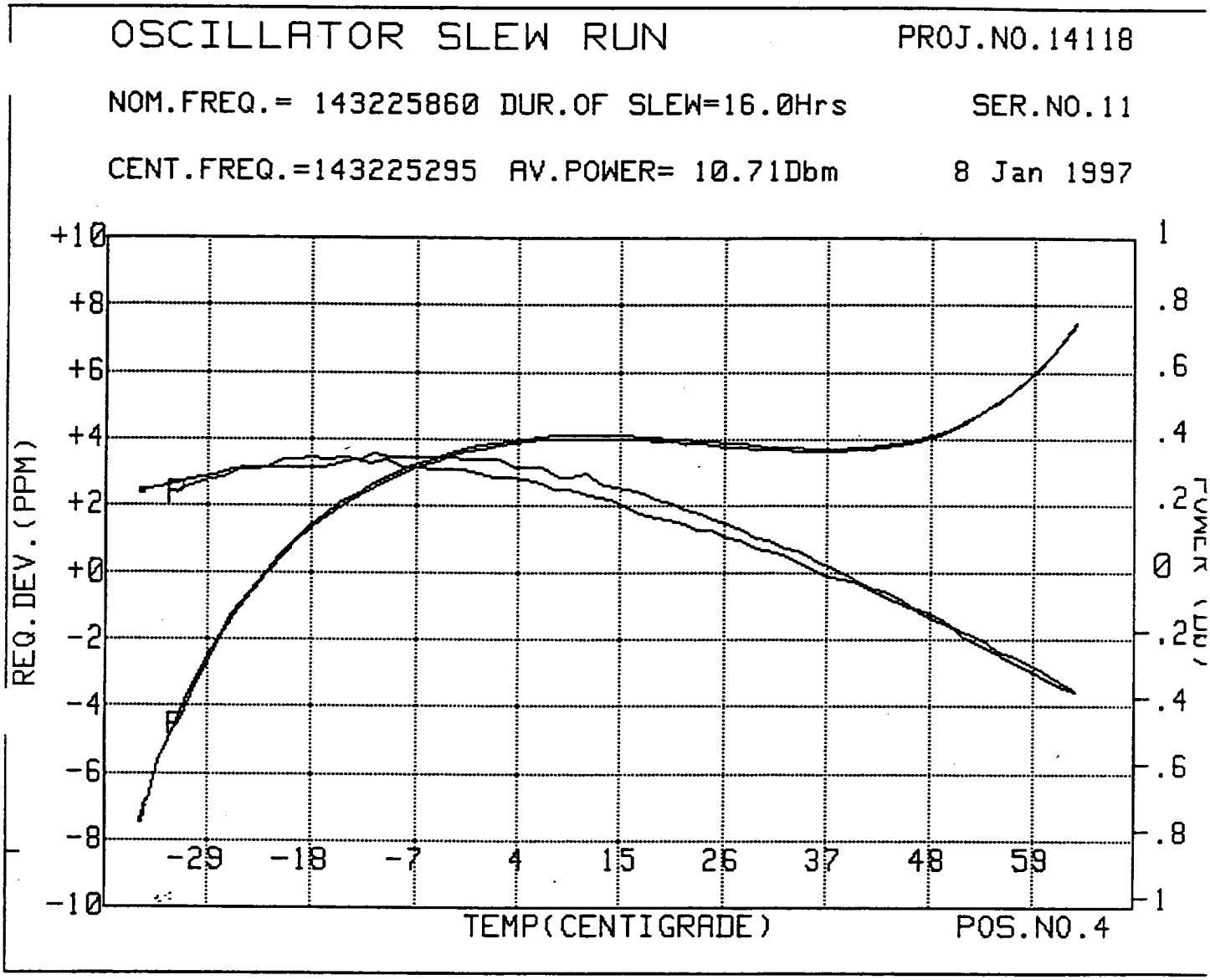
CENT.FREQ.=143225843 AV.POWER= 10.75Dbm 9 Jan 1997



final functional Test

PAR. 5-6.1

S/N 9702-48686



Final functional Test
PAR 5.6.3
S/N 9702-48686

Channel 15 LO

GDO (P/N: 1336610-10, S/N: FM1)

AMSU-A GDO Data Sheet 1

Sequence Description: +20.5°C Comp
Millitech Part Number 9050160001; Serial Number FM1
Aerojet Part Number 1336610-10

Date: 7/14/97 - 7/15/97
Operator: COX
QC Verify Set-up: MTC A4 QA

A. Output Power direct: 16.53 dBm; Output Power in test set-up: 14.15 dBm
Output Power Delta: 2.38 dB

B. Unit Temperature: 20.5°C; Vacuum level: 30 mTorr

C. Baseline Measurements

Vb (volts)	15.0	14.25	15.75	min limit	max limit	Pass/Fail
Vb meas. (Volts)	+15.00	+14.25	+15.75	-.05	+.05	Pass
Ib (mA)	177	177	177	--	230	Pass
fo (GHz)	89.000	89.000	89.000	--	--	
Po (dBm, meas)	+14.30	+14.30	+14.30			
Po (dBm, corr)	+16.68	+16.68	+16.68	13	17	Pass

D. Frequency Pulling, Vb = 15.0 volts; measured ____ V

Fref (GHz)	89.000			min limit	max limit	Pass/Fail
Fmax (GHz)	89.002	+Δ (MHz)	+2	--	+ 5 MHz	Pass
Fmin (GHz)	88.999	- Δ (MHz)	-1	-5 MHz	--	Pass

E. Power Pulling

Pref (dBm)	-5.44			min limit	max limit	Pass/Fail
Pmax (dBm)	-5.59	+Δ (dB)	+0.15	--	+0.2dB	Pass
Pmin (dBm)	-5.29	- Δ (dB)	-0.15	-0.2 dB	--	Pass

F. Turn-on current

Vb (volts)	15.0	min limit	max limit	Pass/Fail
Measured Vb	15.00			Pass
Turn-on current (mA)	177	--	345	Pass
time to peak (ms)	11.2 msec			
time to settle (ms)	11.2 msec			

G. Unit Temperature: 20.5°C Vacuum level: 23 mTorr

DATA SHEET ACCEPT/REJECT

Accept	MTC A4 QA	Reject	
		Test Failure Report No.	
		Report Date	

SIZE	CAGE CODE	DWG. NO.	
A	8V456	TP501600-2	
SCALE	REV. LTR.	A00	SHEET 29 OF 41

AMSU-A GDO Data Sheet 1

Sequence Description: -2°C Comp Date: 7/25/97 -
Millitech Part Number 9050160001; Serial Number FM1 Operator: CSY
Aerojet Part Number 1336610-10 CC Verify Set-up: MTC A4 QA

A. Output Power direct: 16.53 dBm; Output Power in test set-up: 14.15 dBm
Output Power Delta: 2.38 dB

B. Unit Temperature: -2 °C; Vacuum level: 20 mTorr

C. Baseline Measurements

Vb (volts)	15.0	14.25	15.75	min limit	max limit	Pass/Fail
Vb meas. (Volts)	+15.00	+14.25	+15.75	-.05	+.05	Pass
Ib (mA)	171	171	171	--	230	Pass
fo (GHz)	89.005	89.005	89.005	--	--	
Po (dBm, meas)	14.31	14.31	14.31			
Po (dBm, corr)	16.69	16.69	16.69	13	17	Pass

D. Frequency Pulling, Vb = 15.0 volts; measured 15.00V

Fref (GHz)	89.004			min limit	max limit	Pass/Fail
Fmax (GHz)	89.007	+Δ (MHz)	+ 3	--	+ 5 MHz	Pass
Fmin (GHz)	89.002	- Δ (MHz)	- 2	-5 MHz	--	Pass

E. Power Pulling

Pref (dBm)	-5.42			min limit	max limit	Pass/Fail
Pmax (dBm)	-5.29	+Δ (dB)	+0.13	--	+0.2dB	Pass
Pmin (dBm)	-5.53	- Δ (dB)	-0.11	-0.2 dB	--	Pass

F. Turn-on current

Vb (volts)	15.0	min limit	max limit	Pass/Fail
Measured Vb	15.06			Pass
Turn-on current (mA)	171	-	345	Pass
time to peak (ms)	10.2			
time to settle (ms)	10.2			

G. Unit Temperature: -2 °C Vacuum level: 20 mTorr

DATA SHEET ACCEPT/REJECT

Accept	MTC A4 QA	Reject	
		Test Failure Report No.	
		Report Date	

SIZE	CAGE CODE	DWG. NO.	
A	81456	TP501600-2	
SCALE	REV. LTR.	A00	SHEET 29 OF 41

AMSU-A GDO Data Sheet 1

Sequence Description: +43° comp
Millitech Part Number 9050160001; Serial Number FM1
Aerojet Part Number 1336610-10

Date: 7/21/97
Operator: CSY
QC Verify Set-up: _____ (MTC A4 QA)

A. Output Power direct: +14.53 dBm; Output Power in test set-up: +14.15 dBm
Output Power Delta: 2.38 dB

B. Unit Temperature: +43 °C; Vacuum level: 40 mTorr

C. Baseline Measurements

Vb (volts)	15.0	14.25	15.75	min limit	max limit	Pass/Fail
Vb meas. (Volts)	+15.00	+14.25	+15.75	-.05	+.05	Pass
Ib (mA)	184	181	184	--	230	Pass
fo (GHz)	88.994	88.994	88.994	--	--	
Po (dBm, meas)	+13.87	+13.87	+13.97			
Po (dBm, corr)	+16.25	+16.25	+16.25	13	17	Pass

D. Frequency Pulling, Vb = 15.0 volts; measured 15.00 V

Fref (GHz)	88.994			min limit	max limit	Pass/Fail
Fmax (GHz)	84.996	+Δ (MHz)	+ 2	--	+ 5 MHz	Pass
Fmin (GHz)	88.991	- Δ (MHz)	- 3	-5 MHz	--	Pass

E. Power Pulling

Pref (dBm)	5.77			min limit	max limit	Pass/Fail
Pmax (dBm)	5.64	+Δ (dB)	+0.13	--	+0.2dB	Pass
Pmin (dBm)	5.91	- Δ (dB)	-0.4414 CSY	-0.2 dB	--	Pass

F. Turn-on current

Vb (volts)	15.0	min limit	max limit	Pass/Fail
Measured Vb	+15.00			Pass
Turn-on current (mA)	184	--	345	Pass
time to peak (ms)	10.8			
time to settle (ms)	10.8			

G. Unit Temperature: +43 °C Vacuum level: 40 mTorr

DATA SHEET ACCEPT/REJECT

Accept	(MTC A4 QA)	*Reject*	
		Test Failure Report No.	
		Report Date	

SIZE	CAGE CODE	DWG. NO.	
A	8V456	TP501600-2	
SCALE	REV. LTR.	A00	SHEET 29 OF 41

AMSU-A GDO Data Calculation Sheet 8

Sequence Description: Frequency Accuracy & Stability Calculations Date: CSY
Millitech Part Number 9050160001; Serial Number FM1 Operator: 7/29/97
Aerojet Part Number 1336610-10

A. Frequency Accuracy from Thermal Vacuum, CPT and Final LPT Data

	Parameter, Vb = 15.0 volts	Data Sheet, Section	Date, mm/dd/yy	Measurement
1	+Δ, pulling, +20.5°C, MHz	1, D	7/14/97	+2
2	- Δ, pulling, + 20.5°C, MHz	1, D	7/14/97	-1
3	+Δ,pulling, +43°C	1, D	7/21/97	+2
4	-Δ, pulling, +43°C	1, D	7/21/97	-3
5	+Δ, pulling, -2°C	1, D	7/25/97	+3
6	-Δ, pulling, -2°C	1, D	7/25/97	-2
7	Set point w / max Hysteresis, GHz	6, E	7/11/97	89.002
8	Set point w / min Hysteresis, GHz	6, E	7/11/97	88.999
9	(Maximum of lines 1, 3, and 5) +7	89.005		GHz
10	(Maximum of lines 2, 4, and 6) +8	88.996		GHz

B. Frequency Accuracy Result

	Result	min limit	max limit	Pass/Fail
A9, GHz	89.005	–	89.030	Pass
A10, GHz	88.996	88.970	–	Pass

CONTINUED, GO TO NEXT PAGE

AMSU-A GDO Data Calculation Sheet 8, continued

Sequence Description: Frequency Accuracy & Stability Calculations Date: 7/29/97
Millitech Part Number 9050160001; Serial Number FM1 Operator: CSX
Aerojet Part Number 1336610-10

C. Frequency Stability from Comprehensive Performance Test Data

	Bias Voltage, volts	Data Sheet, Section	Date, mm/dd/yy	Tcase, °C	Measurement, GHz
1	14.25	1, C	7/14/97	+20.5	89.000
2	15.0	1, C	7/14/97	+20.5	89.000
3	15.75	1, C	7/14/97	+20.5	89.000
4	14.25	1, C	7/25/97	-2	89.005
5	15.0	1, C	7/25/97	-2	89.005
6	15.75	1, C	7/25/97	-2	89.005
7	14.25	1, C	7/21/97	+43	88.994
8	15.0	1, C	7/21/97	+43	88.994
9	15.75	1, C	7/21/97	+43	88.994
10	((Maximum of 1 through 9) -C2)		* 1000 MHz		+5 MHz
11	((Minimum of 1 through 9) -C2)		* 1000 MHz		-6 MHz

D. Frequency Stability Result

	Result	min limit	max limit	Pass/Fail
C10, MHz	+5	-	+50	Pass
C11, MHz	-6	-50	-	Pass

DATA SHEET ACCEPT/REJECT

Accept	MTC A4 QA	Reject	
		Test Failure Report No.	
		Report Date	

SIZE	CAGE CODE	DWG. NO.	
A	8V456	TP501600-2	
SCALE		REV. LTR. A00	SHEET 37 OF 41

Note: Additional +/-0.1MHz frequency stability reserved for safety margin for channels 11-14.

FREQUENCY STABILITY OF SAW FILTERS

Channel No.	11	12	13	14
Specification (+/-MHz)	0.9	0.9	0.2	0.2
Short-Term Measured (MHz)	+0.731, -0.711	+0.166, -0.200	+0.086, -0.00	+0.014, -0.049
Long-Term By Analysis (+/-MHz)	+0.02	+0.02	+0.02	+0.02
Total	+0.751, -0.711	+0.186, -0.200	+0.106, -0.00	+0.014, -0.049

Note: Additional +/-0.1 MHz frequency stability reserved for safety margin for channels 11-14.

ELECTRICAL TEST DATA SHEET

AEROJET PART: 1331576-1 PHONON PART: 100823 SERIAL: B05
TESTED BY: 210 TITLE: Test Tech DATE: 4/13/99 TIME: 3:30pm
TEST: FINAL FUNCTIONAL
EQUIPMENT: HP 8753D SERIAL: 3410A04374 CAL DUE: 1/29/99
HP 3478A SERIAL: 2136A03127 CAL DUE: 7/7/98

PARAGRAPH REQ.	PARAGRAPH Q/ATP	REQUIREMENT TITLE	DATA		P/F
3.2.1.1	5.2.1	OPERATING TEMPERATURE	15.0	C	P
3.2.1.3	5.2.3	CENTER FREQUENCY &			
3.2.1.4		CENTER FREQUENCY STABILITY			
		LO: 273.335/275.065 MHz	274.496	MHz	P
		HI: 369.335/371.065 MHz	370.073	MHz	P
3.2.1.5	5.2.4	3 dB BANDWIDTH:			
		LO: 34/36 MHz	34.850	MHz	P
		HI: 34/36 MHz	35.334	MHz	P
3.2.1.6	5.2.5	PASSBAND SYMMETRY			
		LO: /0.5 dB	0.3	dB	P
		HI: /0.5 dB	0.2	dB	P
3.2.1.7	5.2.6	PASSBAND RIPPLE			
		260.7-287.7 MHz: /1.0 dB	0.7	dB	P
		356.7-383.7 MHz: /1.0 dB	0.5	dB	P
3.2.1.8	5.2.7	INSERTION LOSS			
		LO: 27.8/30.2 dB	28.9	dB	P
		HI: 27.8/30.2 dB	29.0	dB	P
3.2.1.9	5.2.8	INSERTION LOSS VARIATION			
		LO: -0.4/0.4 dB	0.0	dB	P
		HI: -0.4/0.4 dB	0.0	dB	P
3.2.1.10	5.2.9	AMPLITUDE BALANCE			
		LO,HI: /0.5 dB	0.1	dB	P
3.2.1.11	5.2.10	OUT-OF-BAND REJECTION			
		BAND	PEAK(dB)	WIDTH(MHz)	
		WIDE: 1-225,420-1000 MHz:	44.4	0.000	
		DUAL: 225.000-249.935, 298.465-345.935, 394.465-420.00 MHz:	44.4	0.000	
		PEAK: 35.0/ dB	44.4 dB		P
		WIDTH: /7.2 MHz		0.000 MHz	P
3.2.1.12	5.2.11	SHAPE FACTOR			
		LO: /1.30 Unitless	1.29	Unitless	P
		HI: /1.30 Unitless	1.26	Unitless	P
3.2.1.14	5.2.12	VSWR (RETURN LOSS)			
		260.7-287.7,356.7-383.7 MHz			
		DUAL S11: 7.5/ dB	11.6	dB	P
		DUAL S22: 7.5/ dB	8.9	dB	P
4.8.2	5.2.14	LIMITED FUNCTIONAL TESTS			
		CENTER FREQUENCY: -0.2/0.2 MHz	+0.034	MHz	P
		3 dB BANDWIDTH: -0.72/0.72 MHz	+0.022	MHz	P
		INSERTION LOSS: -0.5/0.5 dB	-0.1	dB	P
NONE	5.2.15	DATA SHEET SUMMARY (PASS/FAIL)	P (DP)		

PHONON CORPORATION
7 HERMAN DRIVE
SIMSBURY, CT 06070

CAGE: 6Y858
TEL: 203-651-0211
FAX: 203-651-8618

ELECTRICAL TEST DATA SHEET

AEROJET PART: 1331576-2 PHONON PART: 100824 SERIAL: 005

TESTED BY: 210 TITLE: Tech DATE: 4/13/98 TIME: 2:30pm

TEST: FINAL FUNCTIONAL

EQUIPMENT: HP 8753D SERIAL: 3410A04374 CAL DUE: 1/29/99

HP 3478A SERIAL: 2136A03127 CAL DUE: 7/7/98

PARAGRAPH REQ.	PARAGRAPH Q/ATP	REQUIREMENT TITLE	DATA		P/F
3.2.1.1	5.2.1	OPERATING TEMPERATURE	15.0	C	P
3.2.1.3	5.2.3	CENTER FREQUENCY &			
3.2.1.4		CENTER FREQUENCY STABILITY			
		LO: 299.335/301.065 MHz	300.240	MHz	P
		HI: 343.335/345.065 MHz	344.112	MHz	P
3.2.1.5	5.2.4	3 dB BANDWIDTH:			
		LO: 15/16 MHz	15.426	MHz	P
		HI: 15/16 MHz	15.476	MHz	P
3.2.1.6	5.2.5	PASSBAND SYMMETRY			
		LO: /0.5 dB	0.0	dB	P
		HI: /0.5 dB	0.3	dB	P
3.2.1.7	5.2.6	PASSBAND RIPPLE			
		294.2-306.2 MHz: /1.0 dB	0.4	dB	P
		338.2-350.2 MHz: /1.0 dB	0.6	dB	P
3.2.1.8	5.2.7	INSERTION LOSS			
		LO: 27.8/30.2 dB	29.0	dB	P
		HI: 27.8/30.2 dB	29.2	dB	P
3.2.1.9	5.2.8	INSERTION LOSS VARIATION			
		LO: -0.4/0.4 dB	0.0	dB	P
		HI: -0.4/0.4 dB	0.0	dB	P
3.2.1.10	5.2.9	AMPLITUDE BALANCE			
		LO,HI: /0.5 dB	0.1	dB	P
3.2.1.11	5.2.10	OUT-OF-BAND REJECTION			
		BAND	PEAK(dB)	WIDTH(MHz)	
		WIDE: 1-286,359-1000 MHz:	44.6	0.000	
		DUAL: 286.000-288.935,			
		311.465-332.935,			
		355.465-359.00 MHz:	45.8	0.000	
		PEAK: 35.0/ dB	44.6 dB		P
		WIDTH: /3.2 MHz		0.000 MHz	P
3.2.1.12	5.2.11	SHAPE FACTOR			
		LO: /1.30 Unitless	1.28	Unitless	P
		HI: /1.30 Unitless	1.30	Unitless	P
3.2.1.14	5.2.12	VSWR (RETURN LOSS)			
		294.2-306.2,338.2-350.2 MHz			
		DUAL S11: 7.5/ dB	13.6	dB	P
		DUAL S22: 7.5/ dB	8.3	dB	P
4.8.2	5.2.14	LIMITED FUNCTIONAL TESTS			
		CENTER FREQUENCY: -0.2/0.2 MHz	+0.014	MHz	P
		3 dB BANDWIDTH: -0.32/0.32 MHz	+0.006	MHz	P
		INSERTION LOSS: -0.5/0.5 dB	+0.2	dB	P
NONE	5.2.15	DATA SHEET SUMMARY (PASS/FAIL)	P (PP)		

PHONON CORPORATION
7 HERMAN DRIVE
SIMSBURY, CT 06070

CAGE: 6Y858
TEL: 203-651-8211
FAX: 203-651-8618

ELECTRICAL TEST DATA SHEET

AEROJET PART: 1331576-3 PHONON PART: 100825 SERIAL: B05
TESTED BY: 210 TITLE: Test Tech DATE: 4/13/98 TIME: 2:30pm
TEST: FINAL FUNCTIONAL
EQUIPMENT: HP 8753D SERIAL: 3410A04374 CAL DUE: 1/29/99
HP 3478A SERIAL: 2136A03127 CAL DUE: 7/7/98

PARAGRAPH REQ.	PARAGRAPH Q/ATP	REQUIREMENT TITLE	DATA		P/F
3.2.1.1	5.2.1	OPERATING TEMPERATURE	15.0	C	P
3.2.1.3	5.2.3	CENTER FREQUENCY &			
3.2.1.4		CENTER FREQUENCY STABILITY			
		LO: 312.035/312.365 MHz	312.281	MHz	P
		HI: 332.035/332.365 MHz	332.242	MHz	P
3.2.1.5	5.2.4	3 dB BANDWIDTH:			
		LO: 7.8/8.0 MHz	7.822	MHz	P
		HI: 7.8/8.0 MHz	7.879	MHz	P
3.2.1.6	5.2.5	PASSBAND SYMMETRY			
		LO: /0.5 dB	0.3	dB	P
		HI: /0.5 dB	0.0	dB	P
3.2.1.7	5.2.6	PASSBAND RIPPLE			
		309.2-315.2 MHz: /1.0 dB	0.8	dB	P
		329.2-335.2 MHz: /1.0 dB	0.4	dB	P
3.2.1.8	5.2.7	INSERTION LOSS			
		LO: 27.8/30.2 dB	28.2	dB	P
		HI: 27.8/30.2 dB	28.2	dB	P
3.2.1.9	5.2.8	INSERTION LOSS VARIATION			
		LO: -0.4/0.4 dB	0.0	dB	P
		HI: -0.4/0.4 dB	0.0	dB	P
3.2.1.10	5.2.9	AMPLITUDE BALANCE			
		LO,HI: /0.5 dB	0.0	dB	P
3.2.1.11	5.2.10	OUT-OF-BAND REJECTION			
		BAND	PEAK(dB)	WIDTH(MHz)	
		WIDE: 1-303,342-1000 MHz:	47.2	0.000	
		DUAL: 303.000-306.835, 317.565-326.835, 337.565-342.00 MHz:	47.4	0.000	
		PEAK: 35.0/ dB	47.2 dB		P
		WIDTH: /1.6 MHz		0.000 MHz	P
3.2.1.12	5.2.11	SHAPE FACTOR			
		LO: /1.30 Unitless	1.28	Unitless	P
		HI: /1.30 Unitless	1.26	Unitless	P
3.2.1.14	5.2.12	VSWR (RETURN LOSS)			
		309.2-315.2,329.2-335.2 MHz			
		DUAL S11: 7.5/ dB	9.9	dB	P
		DUAL S22: 7.5/ dB	8.4	dB	P
4.8.2	5.2.14	LIMITED FUNCTIONAL TESTS			
		CENTER FREQUENCY: -0.1/0.1 MHz	-0.001	MHz	P
		3 dB BANDWIDTH: -0.16/0.16 MHz	±0.002	MHz	P
		INSERTION LOSS: -0.5/0.5 dB	±0.2	dB	P
NONE	5.2.15	DATA SHEET SUMMARY (PASS/FAIL)	P (DP)		

PHONON CORPORATION
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SIMSBURY, CT 06070

CAGE: 6YB58
TEL: 203-651-0211
FAX: 203-651-8618

ELECTRICAL TEST DATA SHEET

EROJET PART: 1331576-4 PHONON PART: 100826 SERIAL: B06
TESTED BY: 210 TITLE: test tech DATE: 4/13/98 TIME: 2:30 p.m
TEST: FINAL FUNCTIONAL
EQUIPMENT: HP 8753D SERIAL: 3410A04374 CAL DUE: 1/29/99
HP 3478A SERIAL: 2136A03127 CAL DUE: 7/7/98

PARAGRAPH REQ.	Q/ATP	REQUIREMENT TITLE	DATA		P/F
3.2.1.1	5.2.1	OPERATING TEMPERATURE	15.0	C	P
3.2.1.3	5.2.3	CENTER FREQUENCY &			
3.2.1.4		CENTER FREQUENCY STABILITY			
		LO: 317.535/317.865 MHz	317.713	MHz	P
		HI: 326.535/326.865 MHz	326.661	MHz	P
3.2.1.5	5.2.4	3 dB BANDWIDTH:			
		LO: 2.8/3.0 MHz	2.935	MHz	P
		HI: 2.8/3.0 MHz	2.948	MHz	P
3.2.1.6	5.2.5	PASSBAND SYMMETRY			
		LO: /0.5 dB	0.0	dB	P
		HI: /0.5 dB	0.3	dB	P
3.2.1.7	5.2.6	PASSBAND RIPPLE			
		316.575-318.825 MHz: /1.0 dB	0.4	dB	P
		325.575-327.825 MHz: /1.0 dB	0.6	dB	P
3.2.1.8	5.2.7	INSERTION LOSS			
		LO: 27.8/30.2 dB	28.5	dB	P
		HI: 27.8/30.2 dB	28.7	dB	P
3.2.1.9	5.2.8	INSERTION LOSS VARIATION			
		LO: -0.4/0.4 dB	0.0	dB	P
		HI: -0.4/0.4 dB	0.0	dB	P
3.2.1.10	5.2.9	AMPLITUDE BALANCE			
		LO,HI: /0.5 dB	0.1	dB	P
3.2.1.11	5.2.10	OUT-OF-BAND REJECTION			
		BAND	PEAK(dB)	WIDTH(MHz)	
		WIDE: 1-313,331-1000 MHz:	46.0	0.000	
		DUAL: 313.000-315.585, 319.815-324.585, 328.815-331.0 MHz:	40.8	0.000	
		PEAK: 35.0/ dB	40.8 dB		P
		WIDTH: /0.6 MHz		0.000 MHz	P
3.2.1.12	5.2.11	SHAPE FACTOR			
		LO: /1.30 Unitless	1.24	Unitless	P
		HI: /1.30 Unitless	1.23	Unitless	P
3.2.1.14	5.2.12	VSWR (RETURN LOSS)			
		316.575-318.825,325.575-327.825 MHz			
		DUAL S11: 7.5/ dB	8.9	dB	P
		DUAL S22: 7.5/ dB	10.6	dB	P
4.8.2	5.2.14	LIMITED FUNCTIONAL TESTS			
		CENTER FREQUENCY: -0.1/0.1 MHz	0.007	MHz	P
		3 dB BANDWIDTH: -0.06/0.06 MHz	±0.002	MHz	P
		INSERTION LOSS: -0.5/0.5 dB	±0.2	dB	P
NONE	5.2.15	DATA SHEET SUMMARY (PASS/FAIL)	P (P)		

PHONON CORPORATION
7 HERMAN DRIVE
SIMSBURY, CT 06070

CAGE: 6Y858
TEL: 203-651-0211
FAX: 203-651-8618

BANDPASS CHARACTERISTICS

FOR

IF FILTERS AND SAW FILTERS

3 dB BANDWIDTH OF IF FILTERS

Channel No.	3	4	5	6	7	8	9	10	15
Specification (MHz)	90	200	170	200	200	165	165	78	6000
3 dB bandwidth (MHz) *	82	192	170	192	192	157	157	78	1020
f_L - f_H (MHz)	8-90	8-200	30-200	8-200	8-200	8-165	8-165	178-256	490-1510
Measured (MHz)									
3 dB bandwidth (MHz)	80.44	189.84	167.71	190.05	190.09	154.99	155.04	76.24	993.69
f_L - f_H (MHz)	8.84-89.28	9.20-199.04	31.34-199.05	9.14-199.19	9.17-199.26	9.07-164.06	9.11-164.15	178.87-255.11	492.98-1486.67

* Actual specifications for IF filters.

3 dB BANDWIDTH FOR SAW FILTERS

Channel No.	11	12	13	14
<u>Specification</u>				
3 dB Bandwidth (MHz)	72	32	16	6
f_{L1} - f_{H1} (MHz)	256.2-292.2	292.2-308.2	308.2-316.2	316.2-319.2
f_{L2} - f_{H2} (MHz)	352.2-388.2	336.2-352.2	328.2-336.2	325.2-328.2
<u>Measured</u>				
3 dB Bandwidth (MHz)	70.184	30.902	15.701	5.883
f_{L1} - f_{H1} (MHz)	257.070-291.921	292.527-307.953	308.370-316.193	316.245-319.180
f_{L2} - f_{H2} (MHz)	352.406-387.740	336.374-351.850	328.303-336.182	325.187-328.135

Channel 3 Bandpass Filter

IF Filter (S/N: 1331559-3, S/N: P229-004)

APPENDIX C **ACCEPTANCE TEST REPORT**

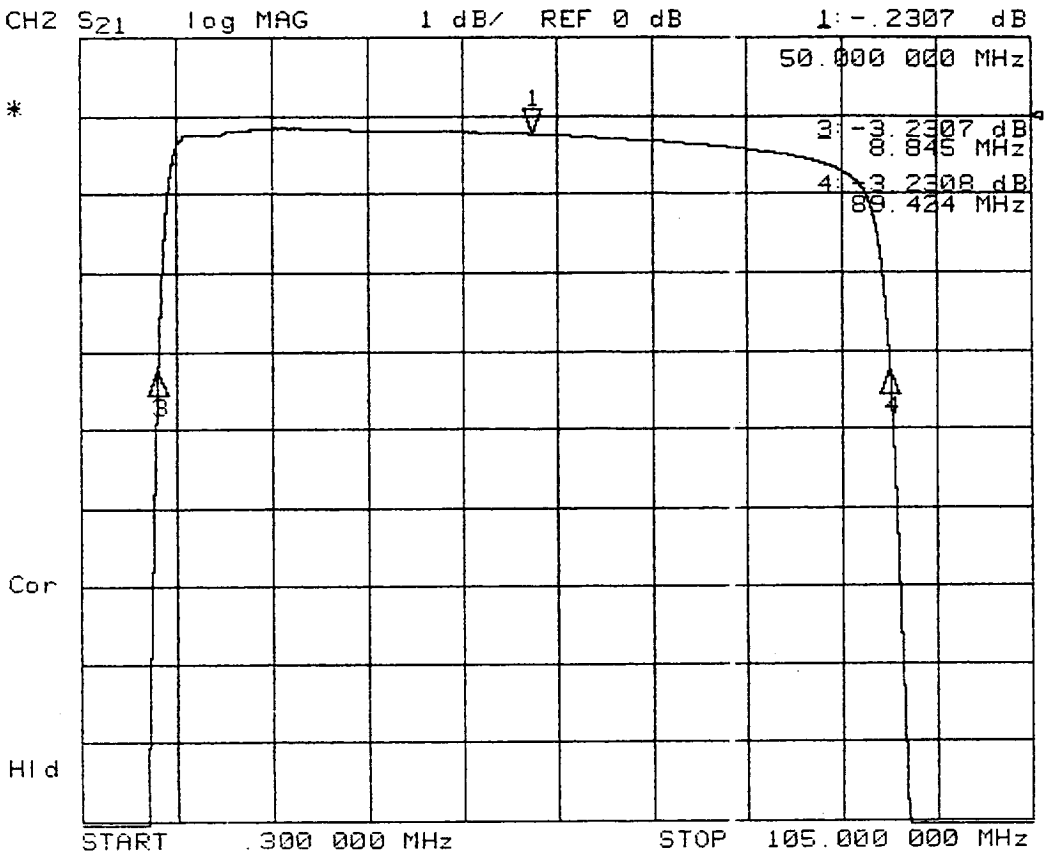
BANDPASS FILTER MODEL HL50-80-10SS1 S/N P229-004
AEROJET 1331559-3 REV. E

3.0 dB BANDWIDTH

ACCEPTANCE TEST PROCEDURE 63-0005-02 PARA 4.5.3	-10°C	+15°C	+40°C
{7} UPPER 3.0 dB BANDEDGE	89.42 MHz (88.0-90.0)	89.28 Mhz (88.0-90.0)	89.11 MHz (88.0-90.0)
{8} LOWER 3.0 dB BANDEDGE	8.85 MHz (8.0-10.0)	8.84 Mhz (8.0-10.0)	8.83 MHz (8.0-10.0)
{9} 3.0 dB RELATIVE BANDWIDTH	80.57 MHz (78.0-82.0)	80.44 Mhz (78.0-82.0)	80.28 MHz (78.0-82.0)
{10} ADD {7} AND {8} ÷ 2 =	49.14 MHz (50.0 NOM)	49.06 MHz (50.0 NOM)	48.97 Mhz (50.0 NOM)
{10a} RECORD MEASURED TEMPERATURE	-13.3 °C (-15.0 TO -10.0)	+14.0 °C (12.5 TO 17.5)	+44.0 °C (40.0 TO 45.0)
{6} ATTACH TRANSMISSION LOSS PERFORMANCE X-Y PLOT	✓ (√)	✓ (√)	✓ (√)

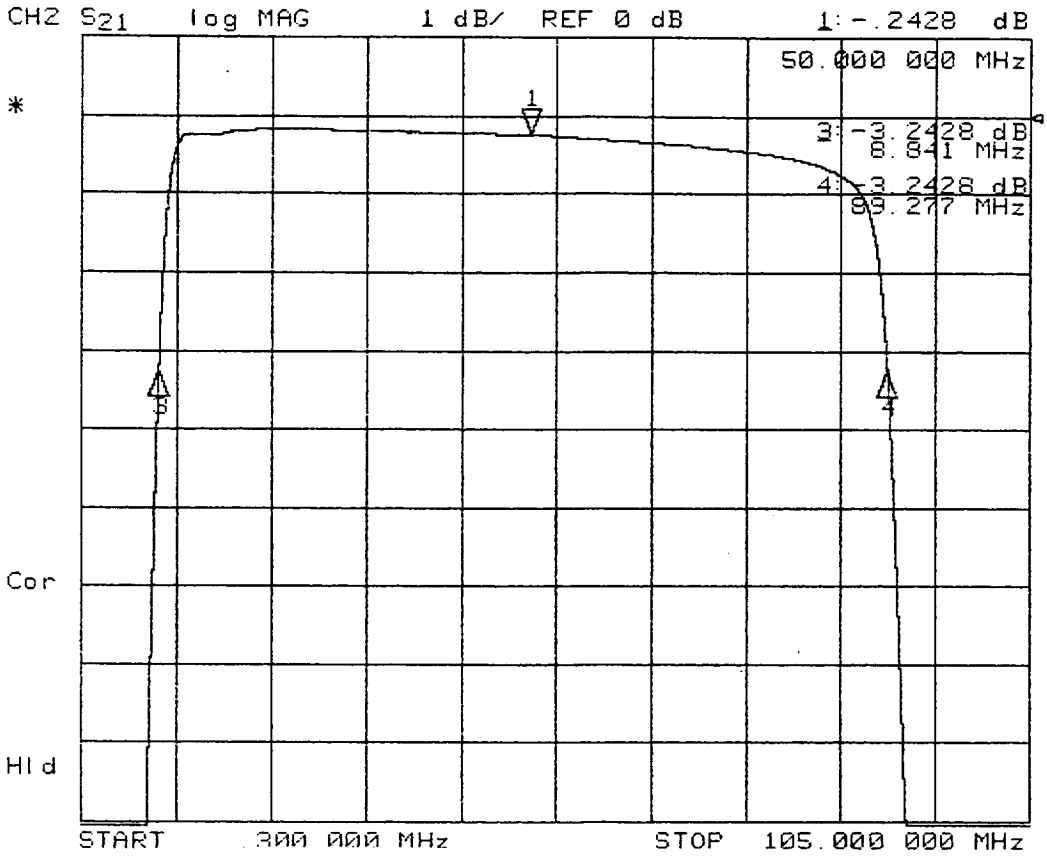
PASSBAND RIPPLE

ACCEPTANCE TEST PROCEDURE 63-0005-02 PARA 4.5.4	-10°C	+15°C	+40°C
{11a} MIN INSERTION LOSS FREQ	21.76 MHz	23.86 Mhz	21.50 MHz
MIN INSERTION LOSS PERFORMANCE	-0.16 dB	-0.16 dB	-0.17 dB
{11b} 75% BW LOWER BANDEDGE FREQ	10.79 MHz	10.73 Mhz	10.68 MHz
75% BW LOWER BANDEDGE I.L. PERF	-0.39 dB	-0.41 dB	-0.44 dB
{11c} 75% BW UPPER BANDEDGE FREQ	70.79 MHz	70.73 Mhz	70.68 MHz
75% BW UPPER BANDEDGE I.L. PERF	-0.39 dB	-0.41 dB	-0.44 dB
{11d} PERFORMANCE DELTA (I.L. @ {11b} - I.L. @ {11a})	0.23 dB	0.25 dB	0.27 dB
{11e} PERFORMANCE DELTA (I.L. @ {11c} - I.L. @ {11a})	0.23 dB	0.25 dB	0.27 dB



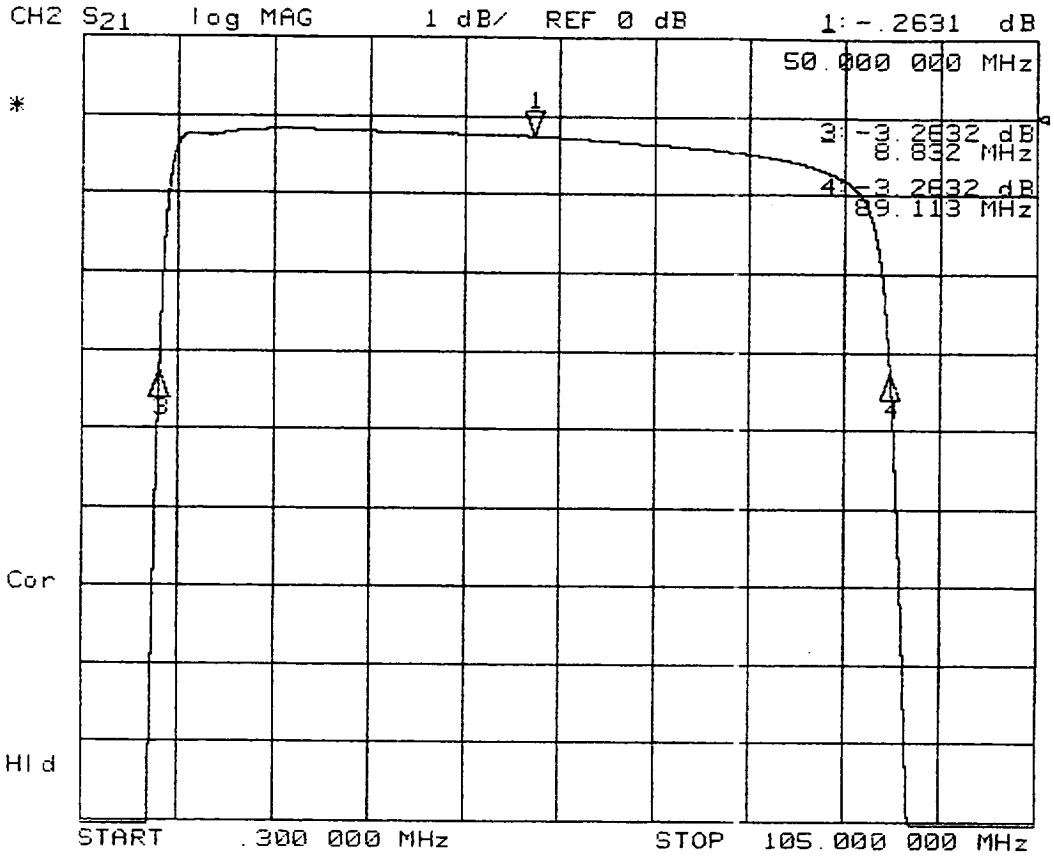
FINAL FUNCTIONAL PERFORMANCE
TRANSMISSION LOSS
SERIAL NO. P229-004
-10C DATA
OPR: R. HOGGATT DATE 1/26/96

MARKER PARAMETERS	Channel 1	Channel 2
MARKER 1	14.000000 MHz OFF	50.000000 MHz -.2307 dB
MARKER 2	86.000000 MHz OFF	49.134765 MHz OFF
MARKER 3	20.000000 MHz OFF	8.845329 MHz -3.2307 dB
MARKER 4	80.000000 MHz OFF	89.424202 MHz -3.2308 dB
MKR STIMULUS OFFSET	0.000000 MHz 0 dB	89.425802 MHz -3.2342 dB
REFERENCE MARKER	OFF	OFF
PLACEMENT	CONTINUOUS	CONTINUOUS
MARKER SEARCH	OFF	OFF
TARGET VALUE	-14 dB	-3 dB
MARKER WIDTH VALUE	-3 dB	-3 dB
	OFF	OFF
MARKER TRACKING	OFF	OFF



FINAL FUNCTIONAL PERFORMANCE
TRANSMISSION LOSS
SERIAL NO. P229-004
+15C DATA
OPR: R. HOGGATT DATE 11/26/96

MARKER PARAMETERS	Channel 1	Channel 2
MARKER 1	14.000000 MHz	50.000000 MHz
	OFF	-.2428 dB
MARKER 2	86.000000 MHz	49.059476 MHz
	OFF	OFF
MARKER 3	20.000000 MHz	8.841246 MHz
	OFF	-3.2428 dB
MARKER 4	80.000000 MHz	89.277706 MHz
	OFF	-3.2428 dB
MKR STIMULUS OFFSET	0.000000 MHz	89.425802 MHz
	0 dB	-3.2342 dB
REFERENCE MARKER	OFF	OFF
PLACEMENT	CONTINUOUS	CONTINUOUS
MARKER SEARCH	OFF	OFF
TARGET VALUE	-14 dB	-3 dB
MARKER WIDTH VALUE	-3 dB	-3 dB
	OFF	OFF
MARKER TRACKING	OFF	OFF



FINAL FUNCTIONAL PERFORMANCE
TRANSMISSION LOSS
SERIAL NO. P229-004
+40C DATA
OPR: R. HOGGATT DATE 1/26/96

MARKER PARAME...	Channel 1	Channel 2
MARKER 1	14.000000 MHz OFF	50.000000 MHz -.2631 dB
MARKER 2	86.000000 MHz OFF	48.972637 MHz OFF
MARKER 3	20.000000 MHz OFF	8.832072 MHz -3.2632 dB
MARKER 4	80.000000 MHz OFF	89.113203 MHz -3.2632 dB
MKR STIMULUS OFFSET	0.000000 MHz 0 dB	89.425802 MHz -3.2342 dB
REFERENCE MARKER	OFF	OFF
PLACEMENT	CONTINUOUS	CONTINUOUS
MARKER SEARCH	OFF	OFF
TARGET VALUE	-14 dB	-3 dB
MARKER WIDTH VALUE	-3 dB	-3 dB
	OFF	OFF
MARKER TRACKING	OFF	OFF

APPENDIX C **ACCEPTANCE TEST REPORT**

BANDPASS FILTER MODEL HL50-80-10SS1 S/N P229-004
AEROJET 1331559-3 REV. E

PASSBAND RIPPLE (CON'T)

{11f} RECORD PASS/FAIL (0.5 dB MAX)	(PASS)/FAIL	(PASS)/FAIL	(PASS)/FAIL
{11g) ATTACH PASSBAND RIPPLE PERFORMANCE X-Y PLOT(S)	✓ (√)	✓ (√)	✓ (√)

OUT-OF-BAND REJECTION

ACCEPTANCE TEST PROCEDURE 63-0005-02 PARA 4.5.5 Fc=50.0 MHz. REF {5A} FOR INSERTION LOSS @ Fc	-10°C	+15°C	+40°C
{12} WORST CASE REJECTION FROM 0.300 MHz TO 1.0 MHz	>100 dB (40.0 dB MIN)	>100 dB (40.0 dB MIN)	>100 dB (40.0 dB MIN)
{13a} WORST CASE REJECTION FROM 102.0 MHz TO 1000.0 MHz	-55.2 dB (40.0 dB MIN)	-56.1 dB (40.0 dB MIN)	-57.1 dB (40.0 dB MIN)
{13c} RECORD MEASURED TEMPERATURE	-13.5 °C (-15.0 TO -10.0)	+14.0°C (12.5 TO 17.5)	+44.0 °C (40.0 TO 45.0)
{14} ATTACH REJECTION PERFORMANCE X-Y PLOT(S)	✓ (√) ✓ (√)	✓ (√) ✓ (√)	✓ (√) ✓ (√)

TEST PERFORMED BY R. Hoggatt DATE 11/26/94 DA 5

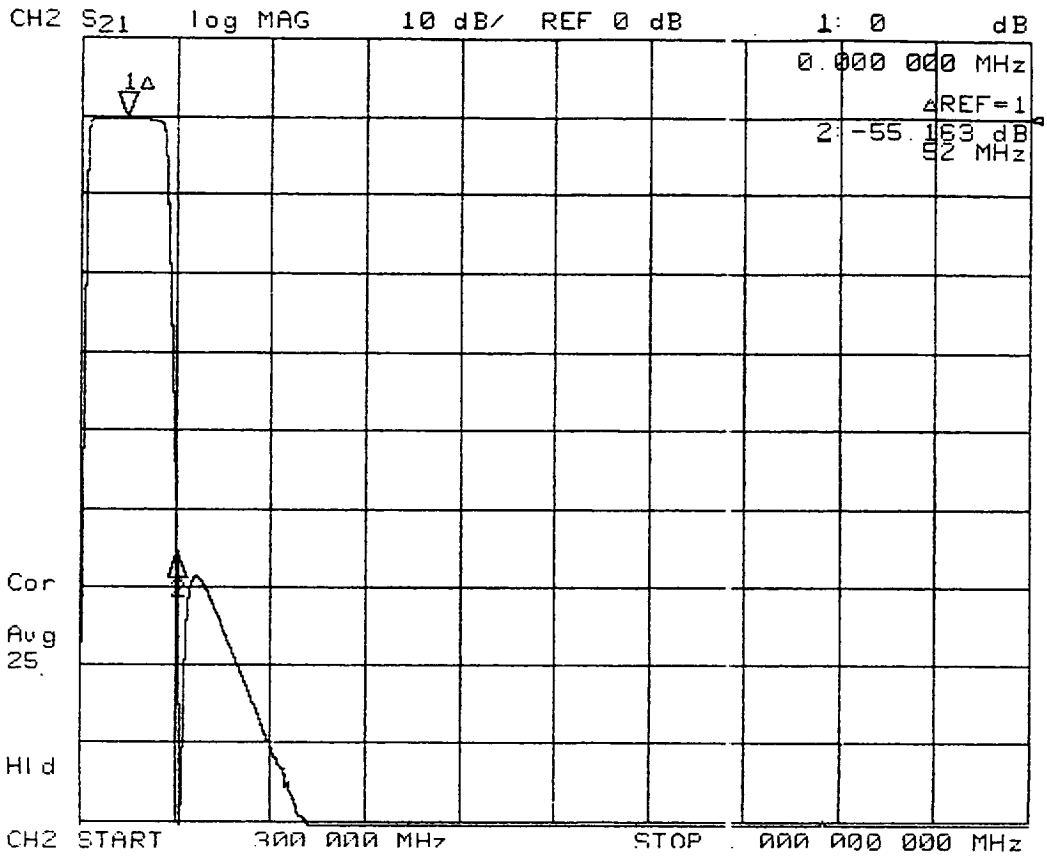
NOTE IF TEST WITNESSED BY AESD: _____ GSI: _____ → NOT WITNESSED THIS TIME

***** END OF FUNCTIONAL PERFORMANCE TEST ****

OUTLINE AND MOUNTING DIMENSIONS VERIFICATION

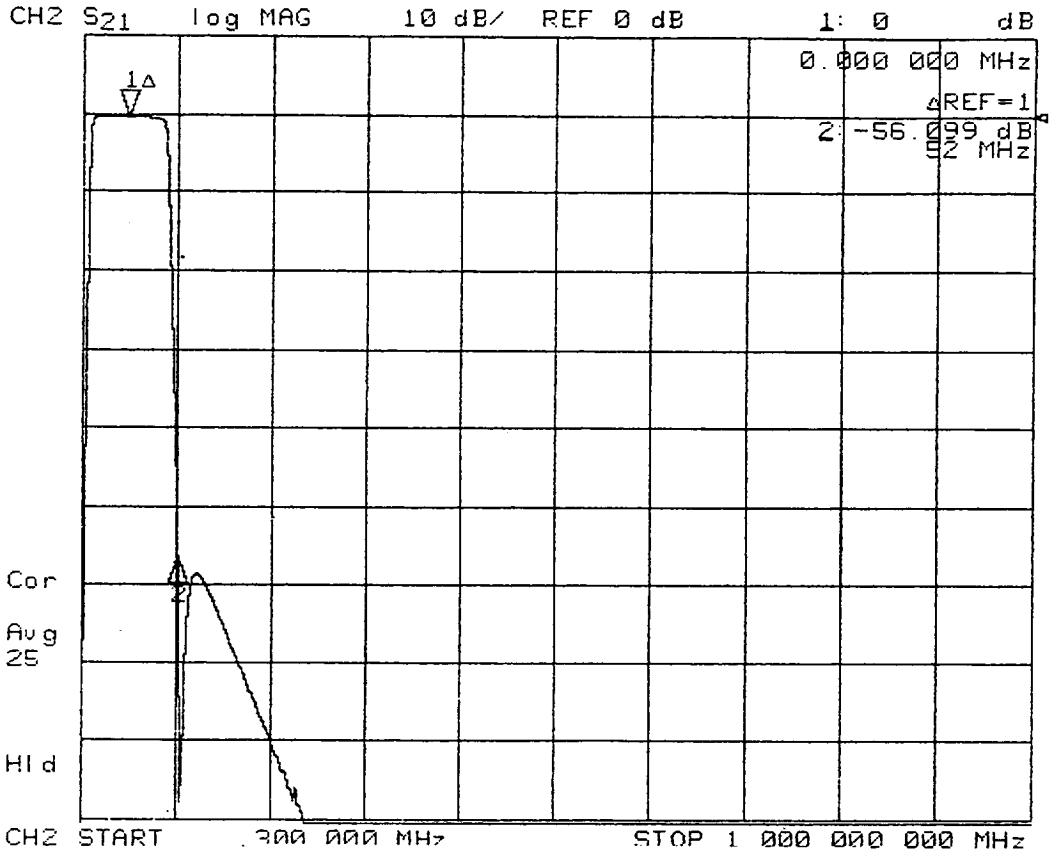
{16} REFERENCE CUSTOMER DRAWING 1331559

DESCRIPTION OF MEASUREMENT	DIMENSION AND TOLERANCE	ACTUAL MEASUREMENT
OVER ALL LENGTH	3.50 ± .03	3.502
MOUNTING HOLE CENTER	0.125 ± .010	.125
BETWEEN UPPER MOUNTING HOLES	3.250	3.250
BETWEEN LOWER MOUNTING HOLES	3.250	3.250



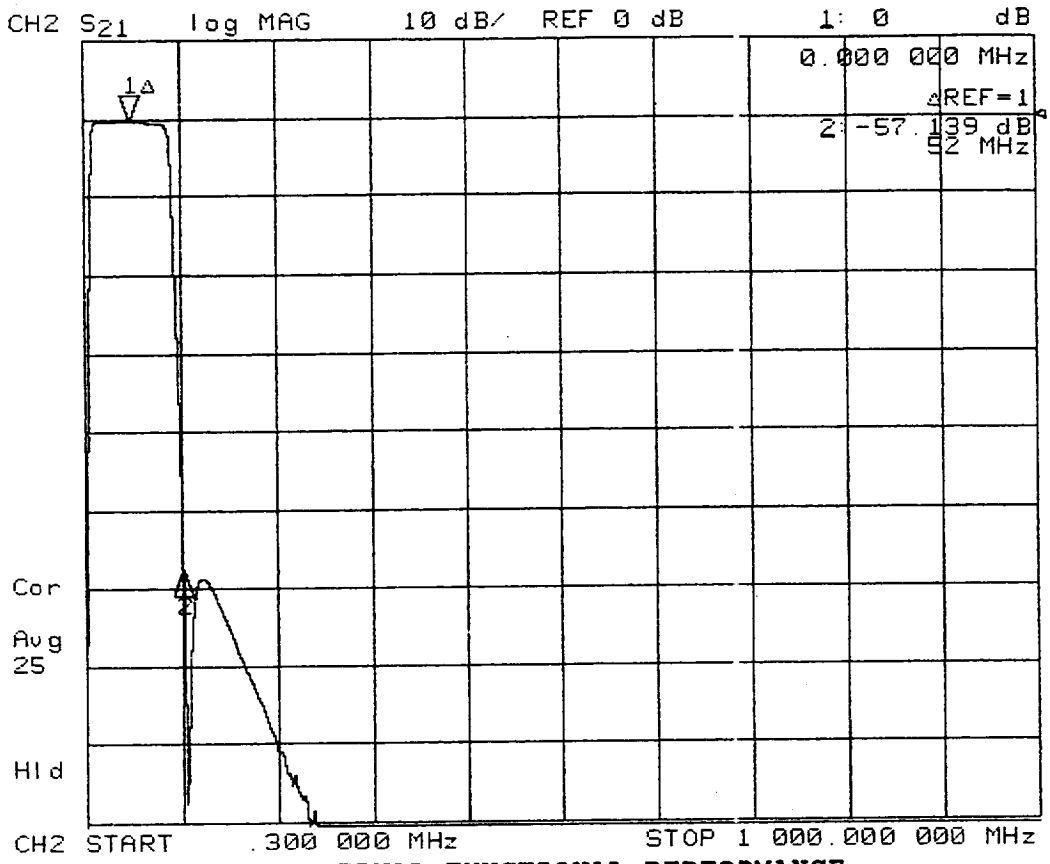
FINAL FUNCTIONAL PERFORMANCE
REJECTION PERFORMANCE
SERIAL NO. P229-004
-10C DATA
OPR: R. HOGGATT DATE 11/26/96

MARKER PARAMETERS	Channel 1	Channel 2
MARKER 1	1.000000 MHz OFF	50.000000 MHz 0 dB
MARKER 2	5.000000 MHz OFF	102.000000 MHz -55.163 dB
MARKER 3	5.000000 MHz OFF	102.000000 MHz OFF
MARKER 4	5.000000 MHz OFF	1000.000000 MHz OFF
MKR STIMULUS OFFSET	0.000000 MHz 0 dB	0.000000 MHz 0 dB
REFERENCE MARKER	OFF	MARKER 1
PLACEMENT	CONTINUOUS	CONTINUOUS
MARKER SEARCH	OFF	OFF
TARGET VALUE	-3 dB	-3 dB
MARKER WIDTH VALUE	-3 dB	-3 dB
	OFF	OFF
MARKER TRACKING	OFF	OFF



FINAL FUNCTIONAL PERFORMANCE
REJECTION PERFORMANCE
SERIAL NO. P229-004
+15C DATA
OPR: R. HOGGATT DATE 11/26/96

MARKER PARAMETERS	Channel 1	Channel 2
MARKER 1	1.000000 MHz	50.000000 MHz
	OFF	0 dB
MARKER 2	5.000000 MHz	102.000000 MHz
	OFF	-56.099 dB
MARKER 3	5.000000 MHz	102.000000 MHz
	OFF	OFF
MARKER 4	5.000000 MHz	1000.000000 MHz
	OFF	OFF
MKR STIMULUS OFFSET	0.000000 MHz	0.000000 MHz
	0 dB	0 dB
REFERENCE MARKER	OFF	MARKER 1
PLACEMENT	CONTINUOUS	CONTINUOUS
MARKER SEARCH	OFF	OFF
TARGET VALUE	-3 dB	-3 dB
MARKER WIDTH VALUE	-3 dB	-3 dB
	OFF	OFF
MARKER TRACKING	OFF	OFF



FINAL FUNCTIONAL PERFORMANCE
REJECTION PERFORMANCE
SERIAL NO. P229-004
+40C DATA
OPR: R. HOGGATT DATE 11/26/96

MARKER PARAMETERS	Channel 1	Channel 2
MARKER 1	1.000000 MHz OFF	50.000000 MHz 0 dB
MARKER 2	5.000000 MHz OFF	102.000000 MHz -57.139 dB
MARKER 3	5.000000 MHz OFF	102.000000 MHz OFF
MARKER 4	5.000000 MHz OFF	1000.000000 MHz OFF
MKR STIMULUS OFFSET	0.000000 MHz 0 dB	0.000000 MHz 0 dB
REFERENCE MARKER	OFF	MARKER 1
PLACEMENT	CONTINUOUS	CONTINUOUS
MARKER SEARCH	OFF	OFF
TARGET VALUE	-3 dB	-3 dB
MARKER WIDTH VALUE	-3 dB	-3 dB
	OFF	OFF
MARKER TRACKING	OFF	OFF

APPENDIX C **ACCEPTANCE TEST REPORT**

BANDPASS FILTER MODEL HL50-80-10SS1 S/N P229-004
AEROJET 1331559-3 REV. E

BANDPASS CHARACTERISTICS MEASUREMENT
PER ATP PARA 4.6
(REF: AE-24687, PARA 4.8.2)

RECORD THE AMBIENT ROOM TEMPERATURE. +23.5 °C (+19°C TO +29.0°C)

{15} ATTACH PASSBAND PERFORMANCE X-Y PLOT ✓(√)

{24} TEST POINT MATRIX

REF	FREQ	UNIT	VALUE	REF	FREQ	UNIT	VALUE
F1	0.5	MHz	-160.5 dB	F11	(*) 60.0	MHz	-0.34 dB
F2	1.0	MHz	-92.9 dB	F12	(*) 70.0	MHz	-0.41 dB
F3	5.0	MHz	-30.7 dB	F13	80.0	MHz	-0.62 dB
F4	7.5	MHz	-9.98 dB	F14	85.0	MHz	-0.85 dB
F5	10.0	MHz	-1.25 dB	F15	90.0	MHz	-5.24 dB
F6	15.0	MHz	-0.27 dB	F16	100.0	MHz	-44.9 dB
F7	20.0	MHz	-0.19 dB	F17	200.0	MHz	-80.1 dB
F8	(*) 30.0	MHz	-0.19 dB	F18	300.0	MHz	-101.6 dB
F9	(*) 40.0	MHz	-0.22 dB	F19	500.0	MHz	-102.3 dB
F10	50.0	MHz	-0.25 dB	F20	1000.0	MHz	-103.6 dB

TEST PERFORMED BY: R. HOGGATT DATE 11/26/96 (DA 6)

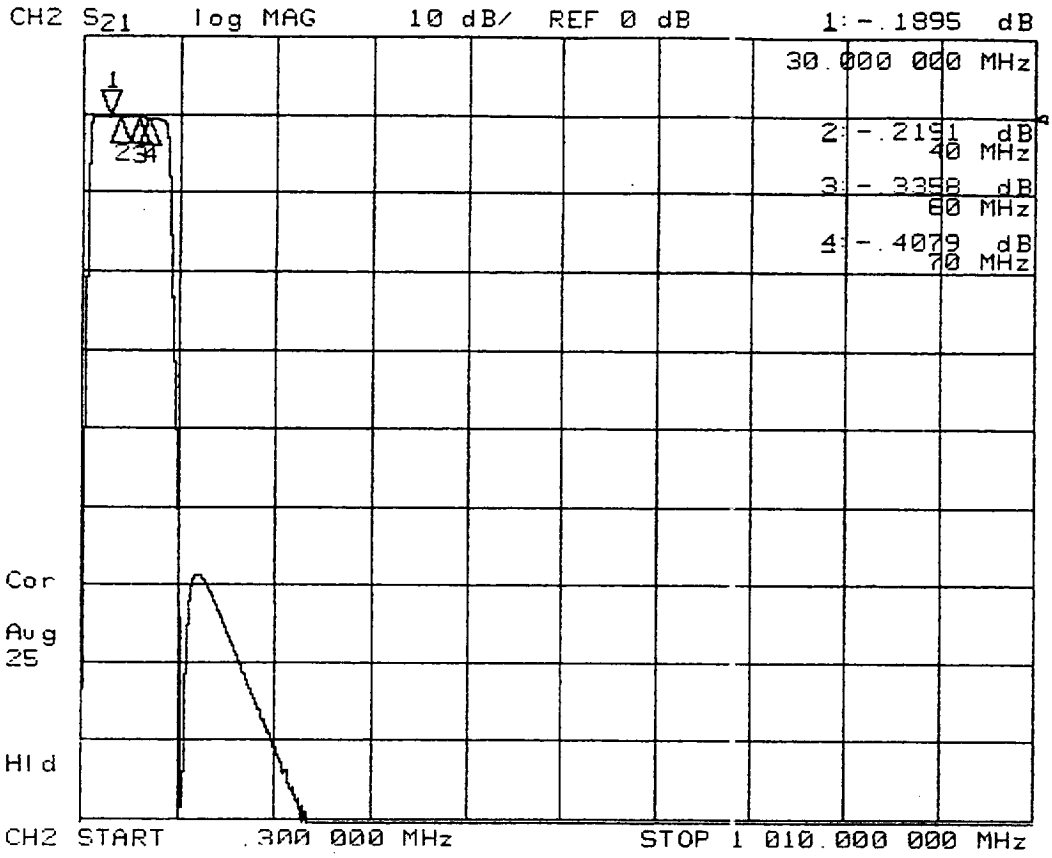
NOTE IF TEST WITNESSED BY AESD _____ GSI _____ > Not Witnessed This time

***** END OF BANDPASS CHARACTERISTICS TEST *****

FUNCTIONAL PERFORMANCE TEST
ACCEPTANCE TEST PROCEDURE
63-0005-02 PARA 4.1

BRIEF TEST DESCRIPTION: THE TESTS DESCRIBED IN APPENDIX C PAGE 10 THRU PAGE 13 ARE PERFORMED TO DOCUMENT THE FUNCTIONAL PERFORMANCE OF THE UNIT AT THE CONCLUSION OF ALL ENVIRONMENTAL TESTING. THE TESTS ARE AS FOLLOWS AND IN ANY SEQUENCE:

a.) VSWR PER ATP PARA 4.5.1.
b.) INSERTION LOSS PER ATP PARA 4.5.2
c.) INSERTION LOSS VS TEMPERATURE PER ATP PARA 4.5.6.
d.) 3.0 dB BANDWIDTH PER ATP PARA 4.5.3.
e.) CENTER FREQUENCY (fc) PER ATP PARA 4.5.7 (PART OF 3.0 dB B/W TEST)
f.) PASSBAND RIPPLE PER ATP PARA 4.5.4 (PART OF INSERTION LOSS TEST).
g.) OUT-OF-BAND REJECTION PER ATP PARA 4.5.5.



POST THERMAL CYCLE
PASSBAND CHARACTERISTICS
SERIAL NO. P229-004
AMBIENT
OPR: R. HOGGATT DATE 1/26/96

MARKER PARAMETERS	Channel 1	Channel 2
MARKER 1	1.000000 MHz	30.000000 MHz
	OFF	-.1895 dB
MARKER 2	5.000000 MHz	40.000000 MHz
	OFF	-.2191 dB
MARKER 3	5.000000 MHz	60.000000 MHz
	OFF	-.3358 dB
MARKER 4	5.000000 MHz	70.000000 MHz
	OFF	-.4079 dB
MKR STIMULUS OFFSET	0.000000 MHz	0.000000 MHz
	0 dB	0 dB
REFERENCE MARKER	OFF	OFF
PLACEMENT	CONTINUOUS	CONTINUOUS
MARKER SEARCH	OFF	OFF
TARGET VALUE	-3 dB	-3 dB
MARKER WIDTH VALUE	-3 dB	-3 dB
	OFF	OFF
MARKER TRACKING	OFF	OFF

Channel 4 Bandpass Filter

IF Filter (S/N: 1331559-2, S/N: P228-004)

APPENDIX B **QUALIFICATION TEST REPORT**

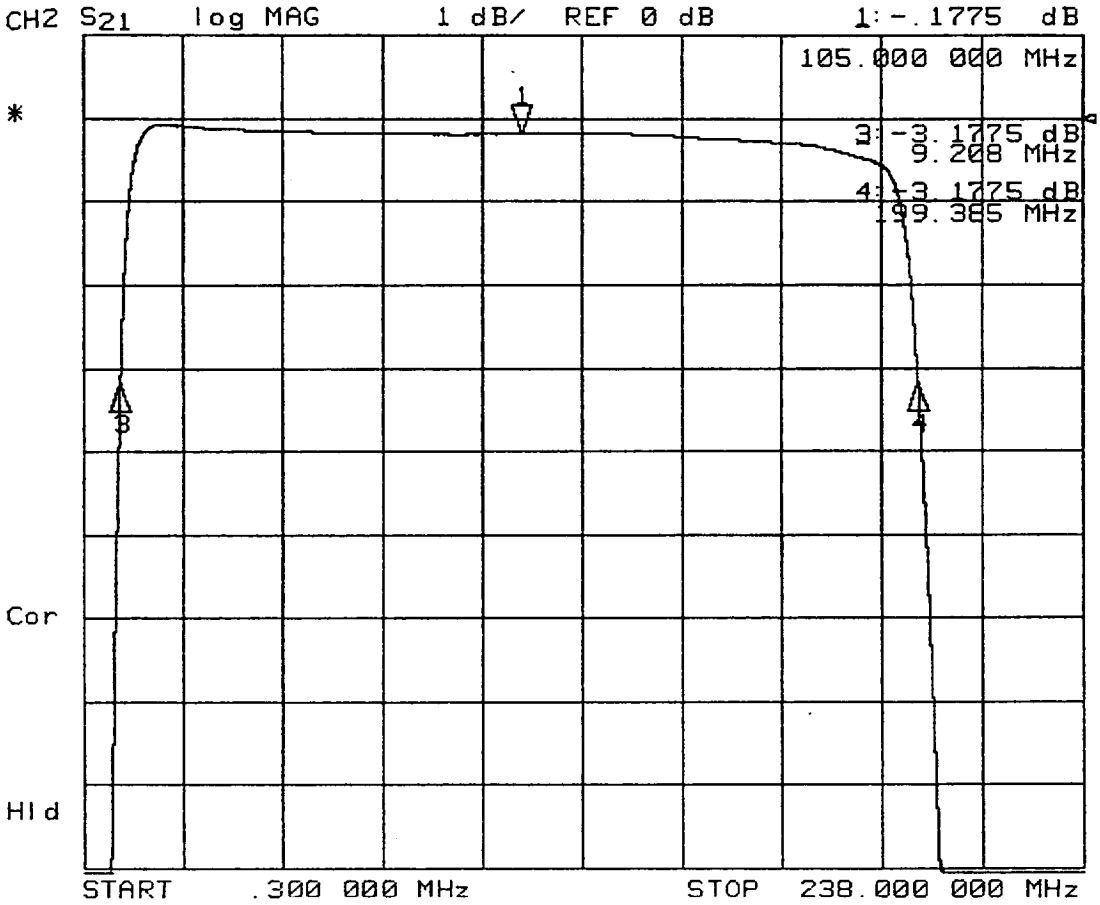
BANDPASS FILTER MODEL HL105-190-10SS1 S/N P228-001
AEROJET 1331559-2 REV. E

3.0 dB BANDWIDTH

QUALIFICATION TEST PROCEDURE 63-0005-010 PARA 4.5.3	-10°C	+15°C	+40°C
{7} UPPER 3.0 dB BANDEDGE	199.39 MHz (198.0-200.0)	99.04 Mhz (198.0-200.0)	198.71 MHz (1480.01500.0)
{8} LOWER 3.0 dB BANDEDGE	9.21 MHz (8.0-10.0)	9.20 Mhz (8.0-10.0)	9.19 MHz (8.0-10.0)
{9} 3.0 dB RELATIVE BANDWIDTH	190.18 MHz (188.0-192.0)	189.84 Mhz (188.0-192.0)	189.52 MHz (188.0-192.0)
{10} ADD {7} AND {8} ÷ 2 =	104.30 MHz (105.0 NOM)	104.12 MHz (105.0 NOM)	103.95 Mhz (105.0 NOM)
{10a} RECORD MEASURED TEMPERATURE	-13.2 °C (-15.0 TO -10.0)	+15.1 °C (12.5 TO 17.5)	+43.2 °C (40.0 TO 45.0)
{6} ATTACH TRANSMISSION LOSS PERFORMANCE X-Y PLOT	✓ (√)	✓ (√)	✓ (√)

PASSBAND RIPPLE

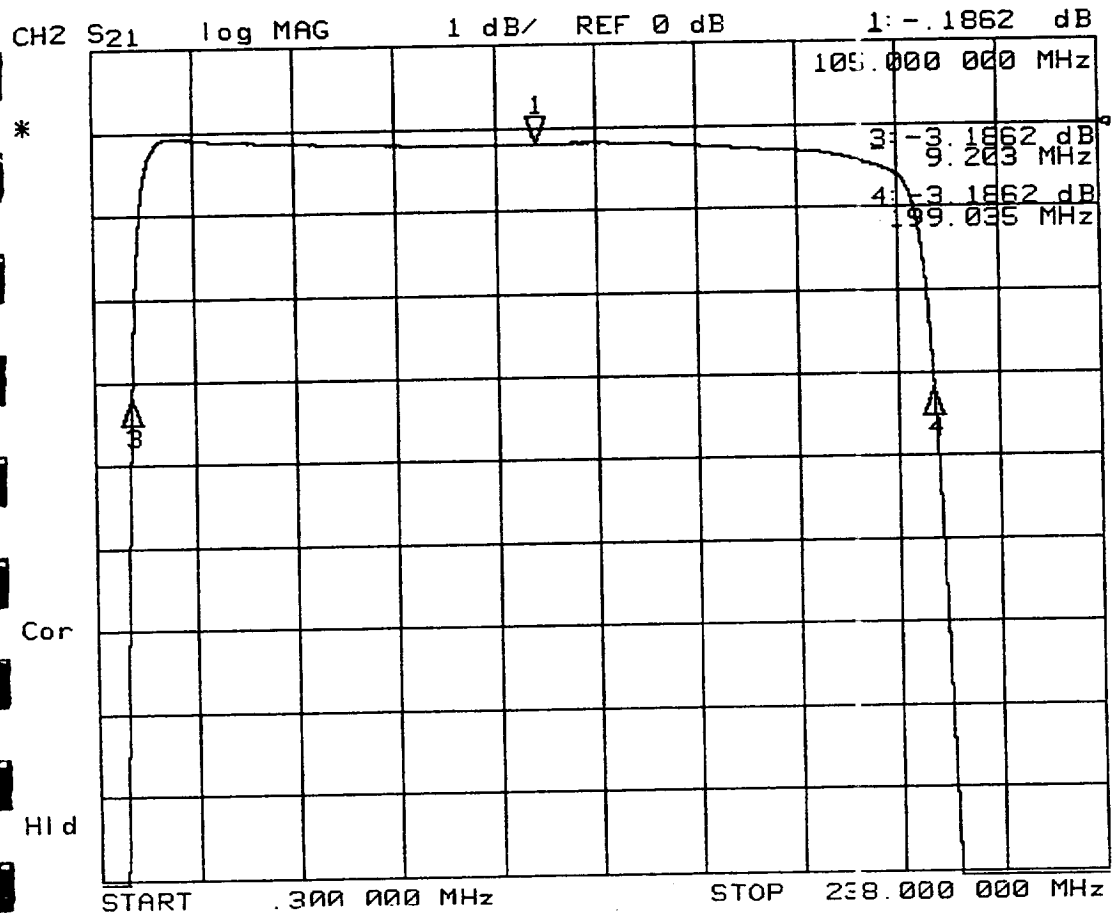
QUALIFICATION TEST PROCEDURE 63-0005-010 PARA 4.5.4	-10°C	+15°C	+40°C
{11a} MIN INSERTION LOSS FREQ	19.32 MHz	19.91 Mhz	19.32 MHz
MIN INSERTION LOSS PERFORMANCE	-0.07 dB	-0.08 dB	-0.08 dB
{11b} 75% BW LOWER BANDEDGE FREQ	14.09 MHz	13.96 Mhz	13.79 MHz
75% BW LOWER BANDEDGE I.L. PERF	-0.25 dB	-0.27 dB	-0.29 dB
{11c} 75% BW UPPER BANDEDGE FREQ	156.59 MHz	156.46 Mhz	156.29 MHz
75% BW UPPER BANDEDGE I.L. PERF	-0.25 dB	-0.27 dB	-0.29 dB
{11d} PERFORMANCE DELTA (I.L. @ {11b} - I.L. @ {11a})	0.18 dB	0.19 dB	0.21 dB
{11e} PERFORMANCE DELTA (I.L. @ {11c} - I.L. @ {11a})	0.18 dB	0.19 dB	0.21 dB



FINAL FUNCTIONAL PERFORMANCE
TRANSMISSION LOSS
SERIAL NO. P228-004
-10C DATA
OPR: R. HOGGATT DATE DEC 27 1996

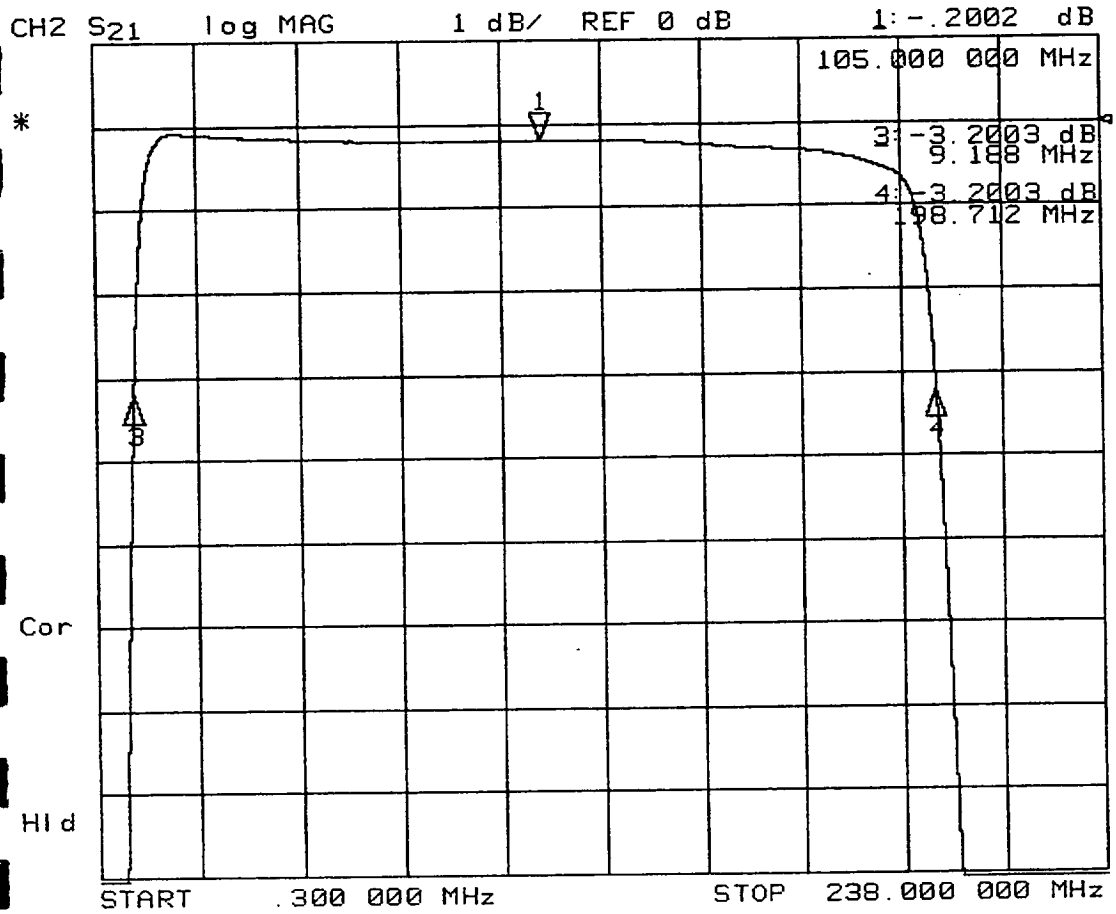
MARKER PARAMET nnel 2

MARKER 1	19.500000 MHz OFF	105.000000 MHz -.1775 dB
MARKER 2	190.500000 MHz OFF	104.297046 MHz OFF
MARKER 3	33.750000 MHz OFF	9.208332 MHz -3.1775 dB
MARKER 4	176.250000 MHz OFF	199.385761 MHz -3.1775 dB
MKR STIMULUS OFFSET	0.000000 MHz 0 dB	89.425802 MHz -3.2342 dB
REFERENCE MARKER	OFF	OFF
PLACEMENT	CONTINUOUS	CONTINUOUS
MARKER SEARCH	OFF	OFF
TARGET VALUE	-14 dB	-3 dB
MARKER WIDTH VALUE	-3 dB	-3 dB
	OFF	OFF
MARKER TRACKING	OFF	OFF



FINAL FUNCTIONAL PERFORMANCE
TRANSMISSION LOSS
SERIAL NO. P228-004
+15C DATA
OPR: R. HOGGATT DATE DEC 27 1996

MARKER PARAMET	annel 2	
MARKER 1	19.500000 MHz OFF	105.000000 MHz -.1862 dB
MARKER 2	190.500000 MHz OFF	104.119562 MHz OFF
MARKER 3	33.750000 MHz OFF	9.203393 MHz -3.1862 dB
MARKER 4	176.250000 MHz OFF	199.035731 MHz -3.1862 dB
MKR STIMULUS OFFSET	0.000000 MHz 0 dB	89.425802 MHz -3.2342 dB
REFERENCE MARKER	OFF	OFF
PLACEMENT	CONTINUOUS	CONTINUOUS
MARKER SEARCH	OFF	OFF
TARGET VALUE	-14 dB	-3 dB
MARKER WIDTH VALUE	-3 dB	-3 dB
	OFF	OFF
MARKER TRACKING	OFF	OFF



FINAL FUNCTIONAL PERFORMANCE
TRANSMISSION LOSS
SERIAL NO. P228-004
+40C DATA
OPR: R. HOGGATT DATE DEC 27 1996 annel 2

MARKER PARAMET		
MARKER 1	19.500000 MHz OFF	105.000000 MHz -.2002 dB
MARKER 2	190.500000 MHz OFF	103.950672 MHz OFF
MARKER 3	33.750000 MHz OFF	9.188879 MHz -3.2003 dB
MARKER 4	176.250000 MHz OFF	198.712466 MHz -3.2003 dB
MKR STIMULUS OFFSET	0.000000 MHz 0 dB	89.425802 MHz -3.2342 dB
REFERENCE MARKER	OFF	OFF
PLACEMENT	CONTINUOUS	CONTINUOUS
MARKER SEARCH	OFF	OFF
TARGET VALUE	-14 dB	-3 dB
MARKER WIDTH VALUE	-3 dB	-3 dB
	OFF	OFF
MARKER TRACKING	OFF	OFF

APPENDIX B **QUALIFICATION TEST REPORT**

BANDPASS FILTER MODEL HL105-190-10SS1 S/N P228-004
AEROJET 1331559-2 REV. E

PASSBAND RIPPLE (CON'T)

{11f} RECORD PASS/FAIL (0.5 dB MAX)	(PASS)/FAIL	(PASS)/FAIL	(PASS)/FAIL
{11g) ATTACH PASSBAND RIPPLE PERFORMANCE X-Y PLOT(S)	✓ (√)	✓ (√)	✓ (√)

OUT-OF-BAND REJECTION

QUALIFICATION TEST PROCEDURE 63-0005-010 PARA 4.5.5 Fc=105.0 MHz. REF {5A} FOR INSERTION LOSS @ Fc	-10°C	+15°C	+40°C
{12} WORST CASE REJECTION FROM 0.300 MHz TO 1.0 MHz	-59.3 dB (40.0 dB MIN)	-59.3 dB (40.0 dB MIN)	-59.3 dB (40.0 dB MIN)
{13a} WORST CASE REJECTION FROM 228.5 MHz TO 1000.0 MHz	-41.5 dB (40.0 dB MIN)	-41.5 dB (40.0 dB MIN)	-41.6 dB (40.0 dB MIN)
{13c} RECORD MEASURED TEMPERATURE	-13.4 °C (-15.0 TO -10.0)	+15.1 °C (12.5 TO 17.5)	+43.2 °C (40.0 TO 45.0)
{14} ATTACH REJECTION PERFORMANCE X-Y PLOT(S)	✓ (√) ✓ (√)	✓ (√) ✓ (√)	✓ (√) ✓ (√)

DA 5

TEST PERFORMED BY R. Hoggatt DATE 12/27/96

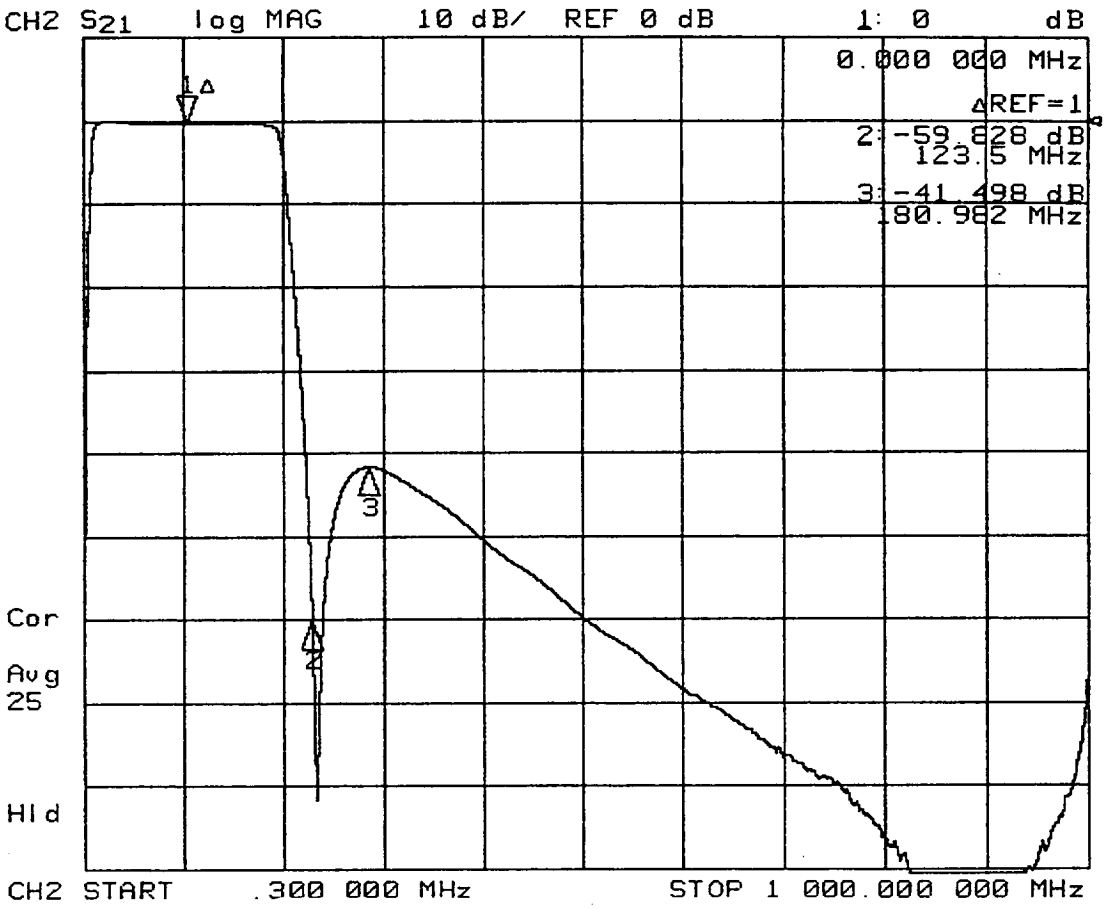
NOTE IF TEST WITNESSED BY AESD: _____ GSI: Not witnessed this time. DLD

***** END OF FUNCTIONAL PERFORMANCE TEST ****

OUTLINE AND MOUNTING DIMENSIONS VERIFICATION

{16} REFERENCE CUSTOMER DRAWING 1331559

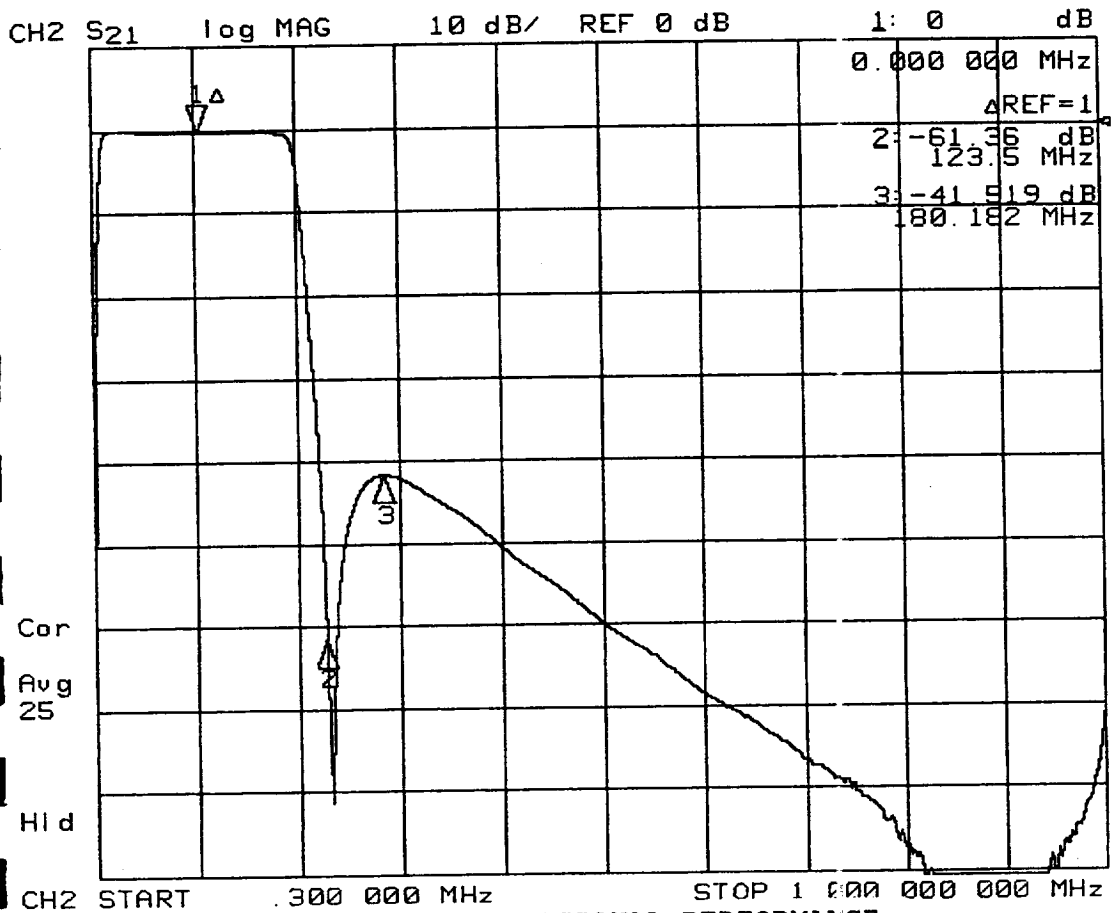
DESCRIPTION OF MEASUREMENT	DIMENSION AND TOLERANCE	ACTUAL MEASUREMENT
OVER ALL LENGTH	3.50 ± .03	3.502
MOUNTING HOLE CENTER	0.125 ± .010	0.128
BETWEEN UPPER MOUNTING HOLES	3.250	3.250
BETWEEN LOWER MOUNTING HOLES	3.250	3.250



FINAL FUNCTIONAL PERFORMANCE
REJECTION PERFORMANCE
SERIAL NO. P228-004
-10C DATA

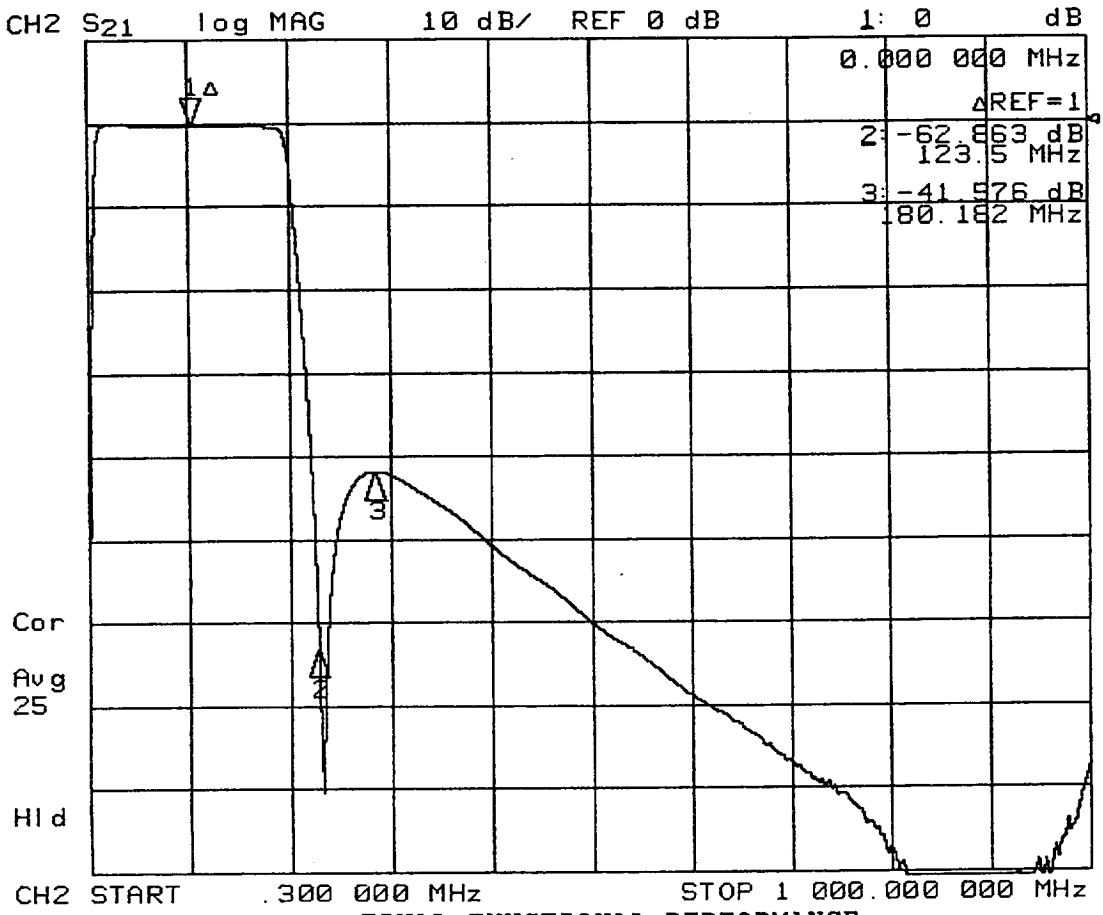
MARKER PARAMET OPR: R. HOGGATT DATE DEC 27 1996 annel 2

MARKER 1		1.000000 MHz	105.000000 MHz
	OFF		0 dB
MARKER 2		5.000000 MHz	228.500000 MHz
	OFF		-59.828 dB
MARKER 3		5.000000 MHz	285.982752 MHz
	OFF		-41.498 dB
MARKER 4		5.000000 MHz	.300000 MHz
	OFF		OFF
MKR STIMULUS OFFSET		0.000000 MHz	0.000000 MHz
		0 dB	0 dB
REFERENCE MARKER		OFF	MARKER 1
PLACEMENT		CONTINUOUS	CONTINUOUS
MARKER SEARCH		OFF	OFF
TARGET VALUE		-3 dB	-3 dB
MARKER WIDTH VALUE		-3 dB	-3 dB
		OFF	OFF
MARKER TRACKING		OFF	OFF



FINAL FUNCTIONAL PERFORMANCE
REJECTION PERFORMANCE
SERIAL NO. P228-004
+15C DATA
OPR: R. HOGGATT DATE DEC 2[illegible] 1996

MARKER PARAMET	annel 2	
MARKER 1	1.000000 MHz OFF	105.000000 MHz 0 dB
MARKER 2	5.000000 MHz OFF	228.500000 MHz -61.36 dB
MARKER 3	5.000000 MHz OFF	285.182992 MHz -41.519 dB
MARKER 4	5.000000 MHz OFF	.300000 MHz OFF
MKR STIMULUS OFFSET	0.000000 MHz 0 dB	0.000000 MHz 0 dB
REFERENCE MARKER	OFF	MARKER 1
PLACEMENT	CONTINUOUS	CONTINUOUS
MARKER SEARCH	OFF	OFF
TARGET VALUE	-3 dB	-3 dB
MARKER WIDTH VALUE	-3 dB	-3 dB
	OFF	OFF
MARKER TRACKING	OFF	OFF



FINAL FUNCTIONAL PERFORMANCE
REJECTION PERFORMANCE
SERIAL NO. P228-004
+40C DATA
MARKER PARAMET OPR: R. HOGGATT DATE DEC 27 1996 annel 2

MARKER 1	1.000000 MHz OFF	105.000000 MHz 0 dB
MARKER 2	5.000000 MHz OFF	228.500000 MHz -62.863 dB
MARKER 3	5.000000 MHz OFF	285.182992 MHz -41.576 dB
MARKER 4	5.000000 MHz OFF	.300000 MHz OFF
MKR STIMULUS OFFSET	0.000000 MHz 0 dB	0.000000 MHz 0 dB
REFERENCE MARKER	OFF	MARKER 1
PLACEMENT	CONTINUOUS	CONTINUOUS
MARKER SEARCH	OFF	OFF
TARGET VALUE	-3 dB	-3 dB
MARKER WIDTH VALUE	-3 dB	-3 dB
	OFF	OFF
MARKER TRACKING	OFF	OFF

APPENDIX B **QUALIFICATION TEST REPORT**

BANDPASS FILTER MODEL HL105-190-10SS1 S/N P228-004
AEROJET 1331559-2 REV. E

BANDPASS CHARACTERISTICS MEASUREMENT
PER QTP PARA 4.6
(REF: AE-24687, PARA 4.8.2)

RECORD THE AMBIENT ROOM TEMPERATURE. +22.8 °C (+19°C TO +29.0°C)

{15} ATTACH PASSBAND PERFORMANCE X-Y PLOT ✓ (√)

{24} TEST POINT MATRIX

REF	FREQ	UNIT	VALUE	REF	FREQ	UNIT	VALUE
F1	0.5	MHz	-82.6 dB	F11	(*) 130.0	MHz	-0.18 dB
F2	1.0	MHz	-66.2 dB	F12	(*) 150.0	MHz	-0.28 dB
F3	5.0	MHz	-17.9 dB	F13	180.0	MHz	-0.41 dB
F4	7.5	MHz	-7.51 dB	F14	190.0	MHz	-0.59 dB
F5	10.0	MHz	-1.86 dB	F15	200.0	MHz	-4.16 dB
F6	20.0	MHz	-0.08 dB	F16	250.0	MHz	-47.6 dB
F7	40.0	MHz	-0.11 dB	F17	300.0	MHz	-42.2 dB
F8	(*) 60.0	MHz	-0.17 dB	F18	400.0	MHz	-50.6 dB
F9	(*) 80.0	MHz	-0.21 dB	F19	500.0	MHz	-60.0 dB
F10	105.0	MHz	-0.19 dB	F20	1000.0	MHz	-75.2 dB

TEST PERFORMED BY: R. Hoggatt (DA 5) DATE 12/27/96

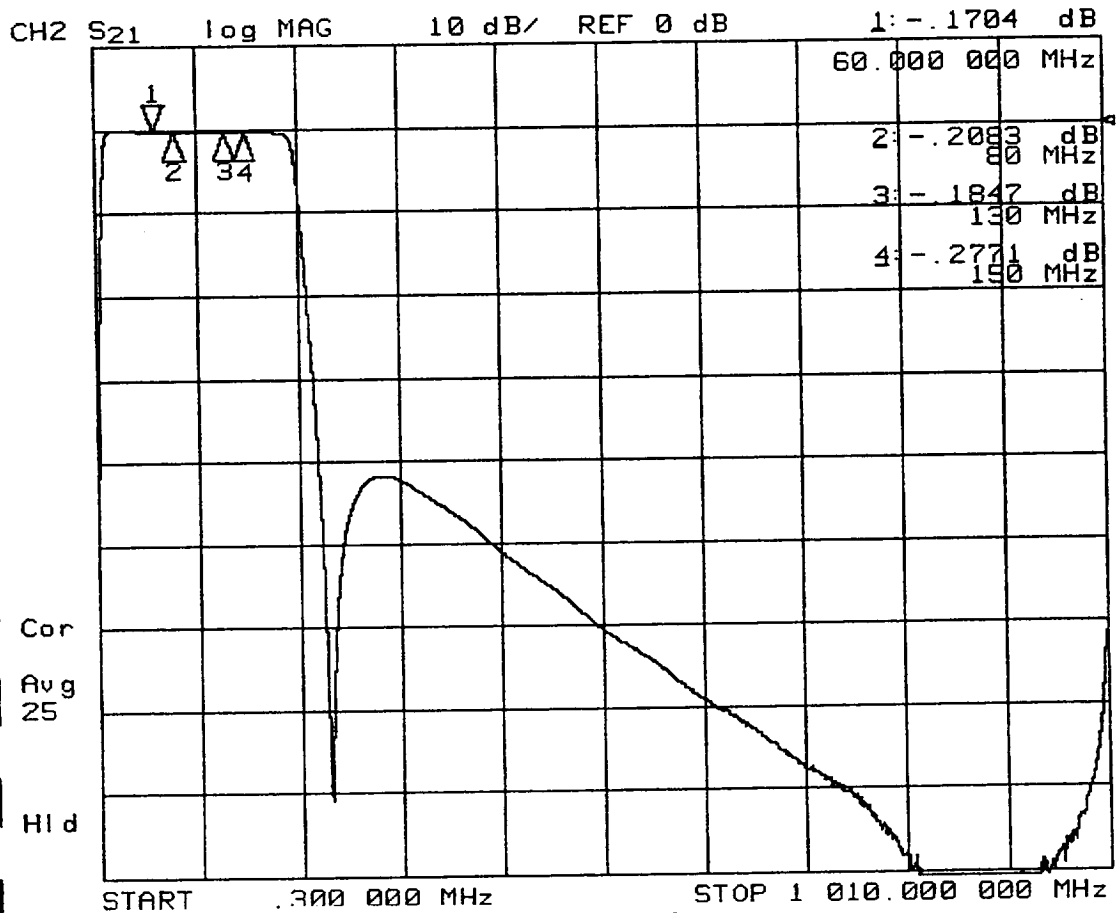
NOTE IF TEST WITNESSED BY AESD _____ GSI __ Not witnessed this time. DLD

***** END OF BANDPASS CHARACTERISTICS TEST *****

FUNCTIONAL PERFORMANCE TEST
QUALIFICATION TEST PROCEDURE
63-0005-010 PARA 4.1

BRIEF TEST DESCRIPTION: THE TESTS DESCRIBED IN APPENDIX B PAGE 10 THRU PAGE 13 ARE PERFORMED TO DOCUMENT THE FUNCTIONAL PERFORMANCE OF THE UNIT AT THE CONCLUSION OF ALL ENVIRONMENTAL TESTING. THE TESTS ARE AS FOLLOWS AND IN ANY SEQUENCE:

a.) VSWR PER QTP PARA 4.5.1.
b.) INSERTION LOSS PER QTP PARA 4.5.2
c.) INSERTION LOSS VS TEMPERATURE PER QTP PARA 4.5.6.
d.) 3.0 dB BANDWIDTH PER QTP PARA 4.5.3.
e.) CENTER FREQUENCY (fc) PER QTP PARA 4.5.7 (PART OF 3.0 dB B/W TEST)
f.) PASSBAND RIPPLE PER QTP PARA 4.5.4 (PART OF INSERTION LOSS TEST).
g.) OUT-OF-BAND REJECTION PER QTP PARA 4.5.5.



POST THERMAL CYCLE
PASSBAND CHARACTERISTICS
SERIAL NO. P228-004
AMBIENT
OPR: R. HOGGATT DATE DEC 27 1996

MARKER PARAME	annel 2	
MARKER 1	17.750000 MHz OFF	60.000000 MHz -.1704 dB
MARKER 2	157.250000 MHz OFF	80.000000 MHz -.2083 dB
MARKER 3	29.375000 MHz OFF	130.000000 MHz -.1847 dB
MARKER 4	145.625000 MHz OFF	150.000000 MHz -.2771 dB
MKR STIMULUS OFFSET	0.000000 MHz 0 dB	89.425802 MHz -3.2342 dB
REFERENCE MARKER	OFF	OFF
PLACEMENT	CONTINUOUS	CONTINUOUS
MARKER SEARCH	OFF	OFF
TARGET VALUE	-14 dB	-3 dB
MARKER WIDTH VALUE	-3 dB	-3 dB
	OFF	OFF
MARKER TRACKING	OFF	OFF

Channel 5 Bandpass Filter

IF Filter (S/N: 1331559-5, S/N: P231-004)

APPENDIX E **ACCEPTANCE TEST REPORT**

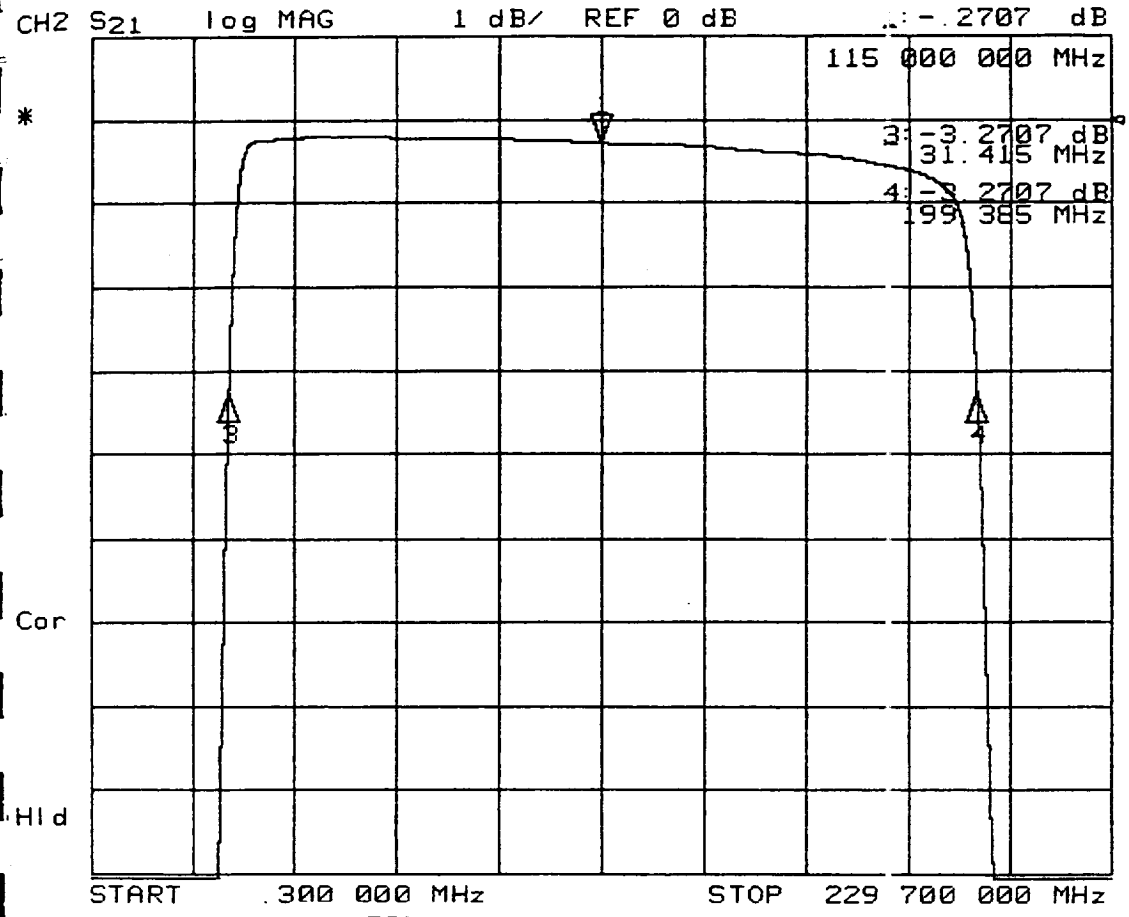
BANDPASS FILTER MODEL HL115-170-10SS1 S/N P231-004
AEROJET 1331559-5 REV. E

3.0 dB BANDWIDTH

ACCEPTANCE TEST PROCEDURE 63-0005-010 PARA 4.5.3	-10°C	+15°C	+40°C
{7} UPPER 3.0 dB BANDEDGE	199.39 MHz (198.0-200.0)	199.05 Mhz (198.0-200.0)	198.77 MHz (198.0-200.0)
{8} LOWER 3.0 dB BANDEDGE	31.42 MHz (30.0-32.0)	31.34 Mhz (30.0-32.0)	31.28 MHz (30.0-32.0)
{9} 3.0 dB RELATIVE BANDWIDTH	167.97 MHz (166.0-170.0)	167.71 Mhz (166.0-170.0)	167.49 MHz (166.0-170.0)
{10} ADD {7} AND {8} ÷ 2 =	115.41 MHz (115.0 NOM)	115.20 MHz (115.0 NOM)	115.03 Mhz (115.0 NOM)
{10a} RECORD MEASURED TEMPERATURE	-13.4 °C (-15.0 TO -10.0)	+16.0 °C (12.5 TO 17.5)	+42.6 °C (40.0 TO 45.0)
{6} ATTACH TRANSMISSION LOSS PERFORMANCE X-Y PLOT	✓ (√)	✓ (√)	✓ (√)

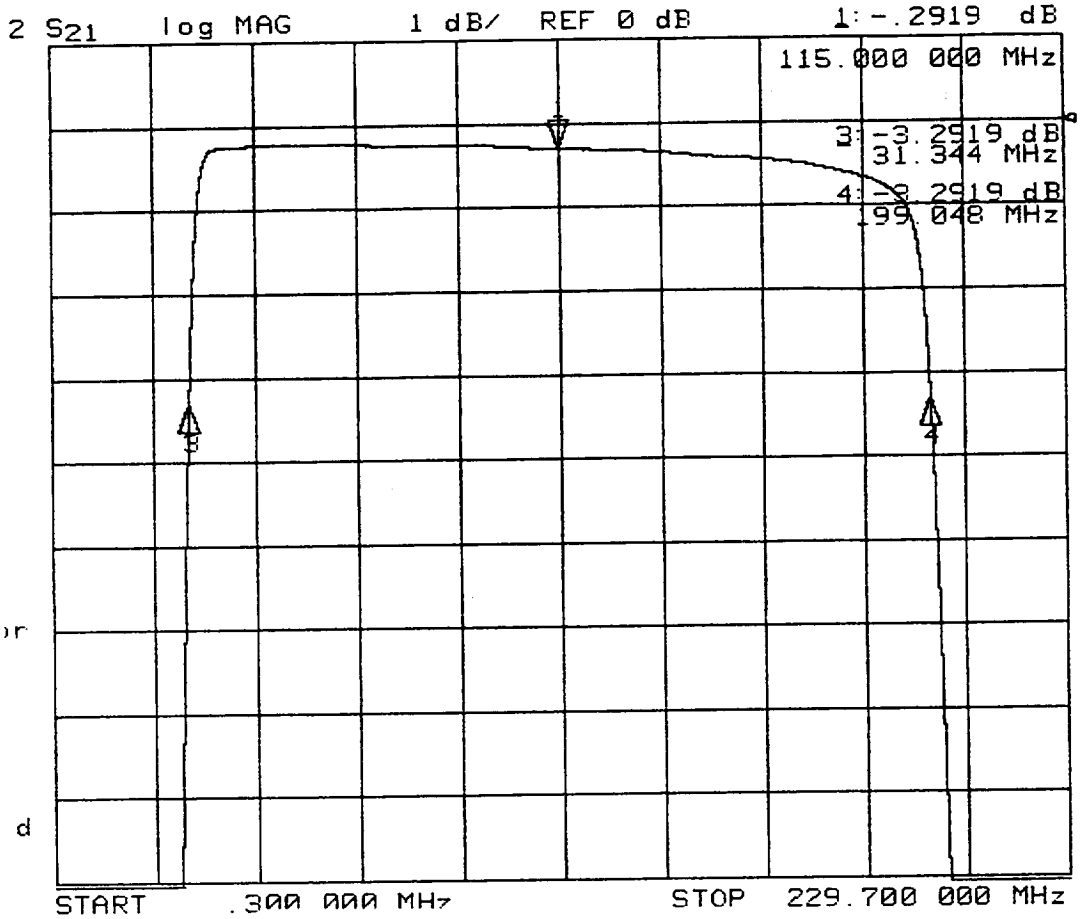
PASSBAND RIPPLE

ACCEPTANCE TEST PROCEDURE 63-0005-010 PARA 4.5.4	-10°C	+15°C	+40°C
{11a} MIN INSERTION LOSS FREQ	57.08 MHz	55.36 Mhz	57.08 MHz
MIN INSERTION LOSS PERFORMANCE	-0.19 dB	-0.21 dB	-0.22 dB
{11b} 75% BW LOWER BANDEDGE FREQ	34.93 MHz	34.77 Mhz	34.65 MHz
75% BW LOWER BANDEDGE I.L. PERF	-0.41 dB	-0.44 dB	-0.46 dB
{11c} 75% BW UPPER BANDEDGE FREQ	162.43 MHz	162.27 Mhz	162.15 MHz
75% BW UPPER BANDEDGE I.L. PERF	-0.41 dB	-0.44 dB	-0.46 dB
{11d} PERFORMANCE DELTA (I.L. @ {11b} - I.L. @ {11a})	0.22 dB	0.23 dB	0.24 dB
{11e} PERFORMANCE DELTA (I.L. @ {11c} - I.L. @ {11a})	0.22 dB	0.23 dB	0.24 dB



FINAL FUNCTIONAL PERFORMANCE
TRANSMISSION LOSS
SERIAL NO. P231-004
-10C DATA
OPR: R. HOGGATT DATE DEC 21 199 annel 2

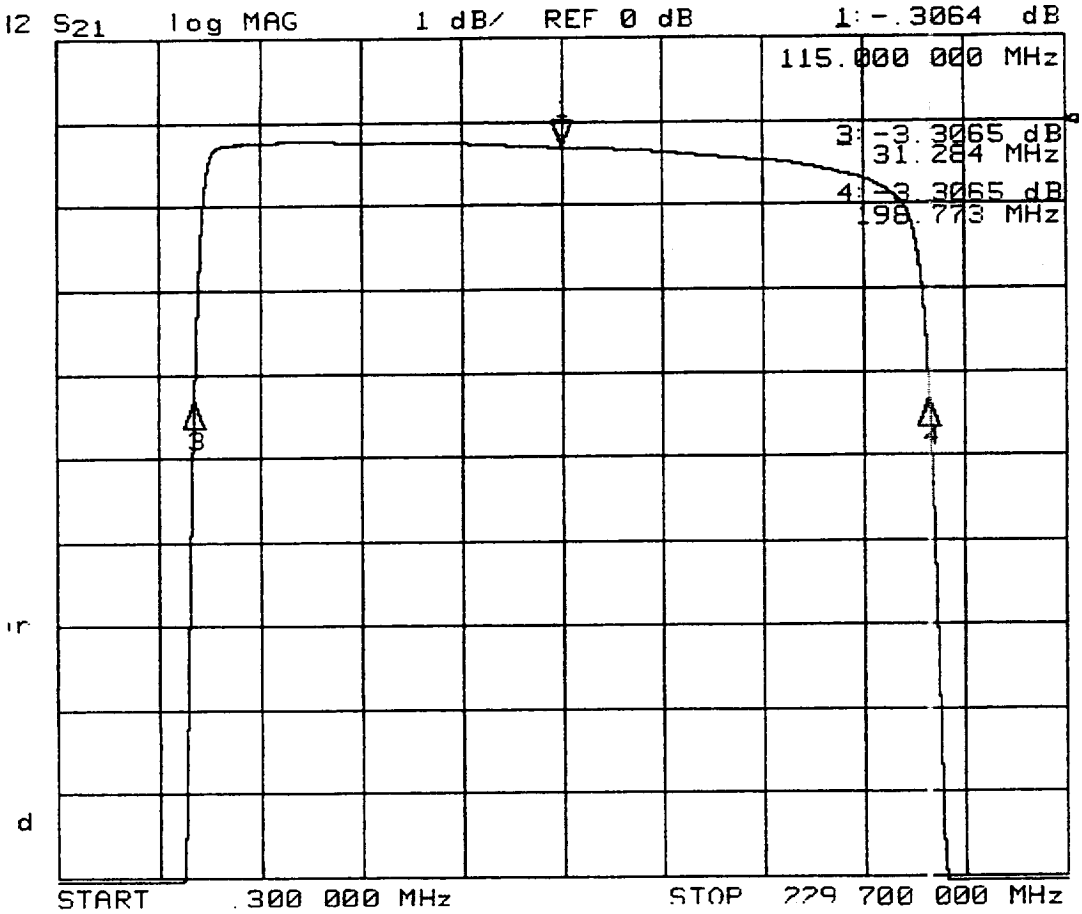
MARKER PARAMET		
MARKER 1	38.500000 MHz	115.000000 MHz
	OFF	-.2707 dB
MARKER 2	191.500000 MHz	115.400191 MHz
	OFF	OFF
MARKER 3	51.250000 MHz	31.415310 MHz
	OFF	-3.2707 dB
MARKER 4	178.750000 MHz	199.385072 MHz
	OFF	-3.2707 dB
MKR STIMULUS OFFSET	0.000000 MHz	89.425802 MHz
	0 dB	-3.2342 dB
REFERENCE MARKER	OFF	OFF
PLACEMENT	CONTINUOUS	CONTINUOUS
MARKER SEARCH	OFF	OFF
TARGET VALUE	-14 dB	-3 dB
MARKER WIDTH VALUE	-3 dB	-3 dB
	OFF	OFF
MARKER TRACKING	OFF	OFF



FINAL FUNCTIONAL PERFORMANCE
TRANSMISSION LOSS
SERIAL NO. P231-004
+15C DATA
OPR: R. HOGGATT DATE DEC 21 1996

ARKER PARAMETI		
ARKER 1	38.500000 MHz OFF	115.000000 MHz -.2919 dB
ARKER 2	191.500000 MHz OFF	115.196326 MHz OFF
ARKER 3	51.250000 MHz OFF	31.344560 MHz -3.2919 dB
ARKER 4	178.750000 MHz OFF	199.048093 MHz -3.2919 dB
KR STIMULUS OFFSET	0.000000 MHz 0 dB	89.425802 MHz -3.2342 dB
EFERENCE MARKER	OFF	OFF
LACEMENT	CONTINUOUS	CONTINUOUS
ARKER SEARCH	OFF	OFF
ARGET VALUE	-14 dB	-3 dB
ARKER WIDTH VALUE	-3 dB	-3 dB
	OFF	OFF
ARKER TRACKING	OFF	OFF

Channel 2



FINAL FUNCTIONAL PERFORMANCE
TRANSMISSION LOSS
SERIAL NO. P231-004
+40C DATA

ARKER PARAMET OPR: R. HOGGATT DATE DEC 21 1996 annel 2

ARKER 1	38.500000 MHz OFF	115.000000 MHz -.3064 dB
ARKER 2	191.500000 MHz OFF	115.029373 MHz OFF
ARKER 3	51.250000 MHz OFF	31.284942 MHz -3.3065 dB
ARKER 4	178.750000 MHz OFF	198.773804 MHz -3.3065 dB
CR STIMULUS OFFSET	0.000000 MHz 0 dB	89.425802 MHz -3.2342 dB
FERENCE MARKER	OFF	OFF
LACEMENT	CONTINUOUS	CONTINUOUS
ARKER SEARCH	OFF	OFF
ARGET VALUE	-14 dB	-3 dB
ARKER WIDTH VALUE	-3 dB	-3 dB
	OFF	OFF
ARKER TRACKING	OFF	OFF

BANDPASS FILTER MODEL HL115-170-10SS1 S/N P231-004
AEROJET 1331559-5 REV. E

PASSBAND RIPPLE (CON'T)

{11f} RECORD PASS/FAIL (0.5 dB MAX)	(PASS)/FAIL	(PASS)/FAIL	(PASS)/FAIL
{11g) ATTACH PASSBAND RIPPLE PERFORMANCE X-Y PLOT(S)	✓ (√)	✓ (√)	✓ (√)

OUT-OF-BAND REJECTION

ACCEPTANCE TEST PROCEDURE 63-0005-010 PARA 4.5.5 Fc=115.0 MHz. REF {5A} FOR INSERTION LOSS @ Fc	-10°C	+15°C	+40°C
{12} WORST CASE REJECTION FROM 0.300 MHz TO 4.5 MHz	>90 dB (40.0 dB MIN)	>90 dB (40.0 dB MIN)	>90 dB (40.0 dB MIN)
{13a} WORST CASE REJECTION FROM 225.5 MHz TO 1000.0 MHz	-57.9 dB (40.0 dB MIN)	-58.9 dB (40.0 dB MIN)	-59.7 dB (40.0 dB MIN)
{13c} RECORD MEASURED TEMPERATURE	-13.3 °C (-15.0 TO -10.0)	+15.8 °C (12.5 TO 17.5)	+42.6 °C (40.0 TO 45.0)
{14} ATTACH REJECTION PERFORMANCE X-Y PLOT(S) (DA 5)	✓ (√)	✓ (√)	✓ (√)

TEST PERFORMED BY R. HOGGATT DATE 12/21/96

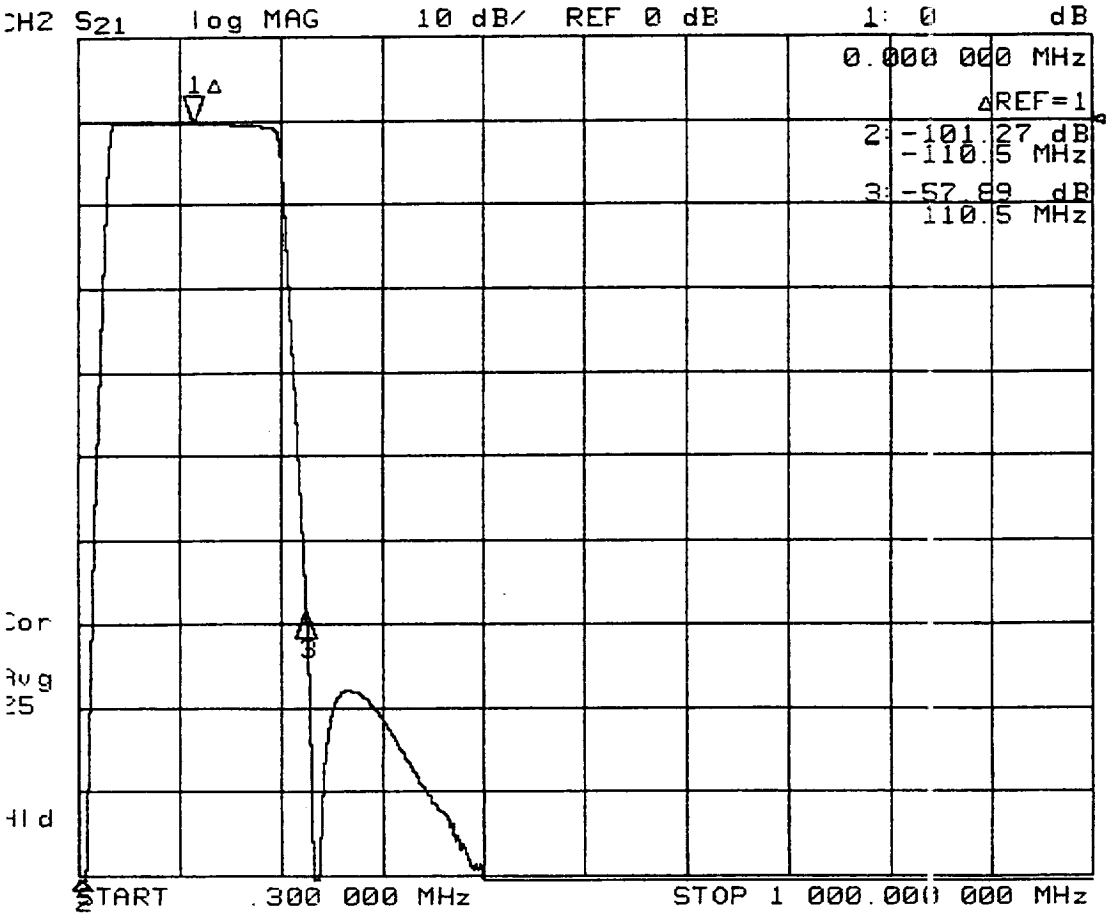
NOTE IF TEST WITNESSED BY AESD: _____ GSI: Not witnessed this time. DLD

***** END OF FUNCTIONAL PERFORMANCE TEST ****

OUTLINE AND MOUNTING DIMENSIONS VERIFICATION

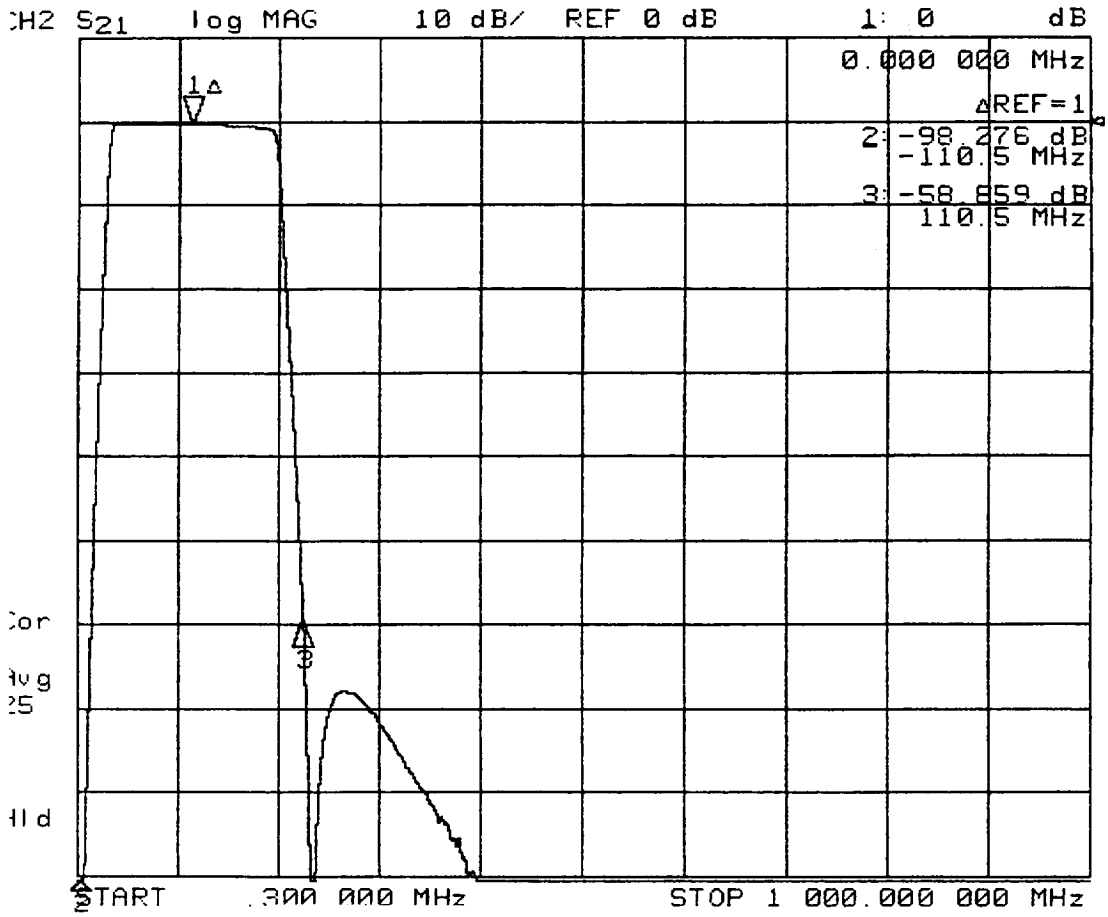
{16} REFERENCE CUSTOMER DRAWING 1331559

DESCRIPTION OF MEASUREMENT	DIMENSION AND TOLERANCE	ACTUAL MEASUREMENT
OVER ALL LENGTH	3.50 ± .03	3.502
MOUNTING HOLE CENTER	0.125 ± .010	0.125
BETWEEN UPPER MOUNTING HOLES	3.250	3.250
BETWEEN LOWER MOUNTING HOLES	3.250	3.250



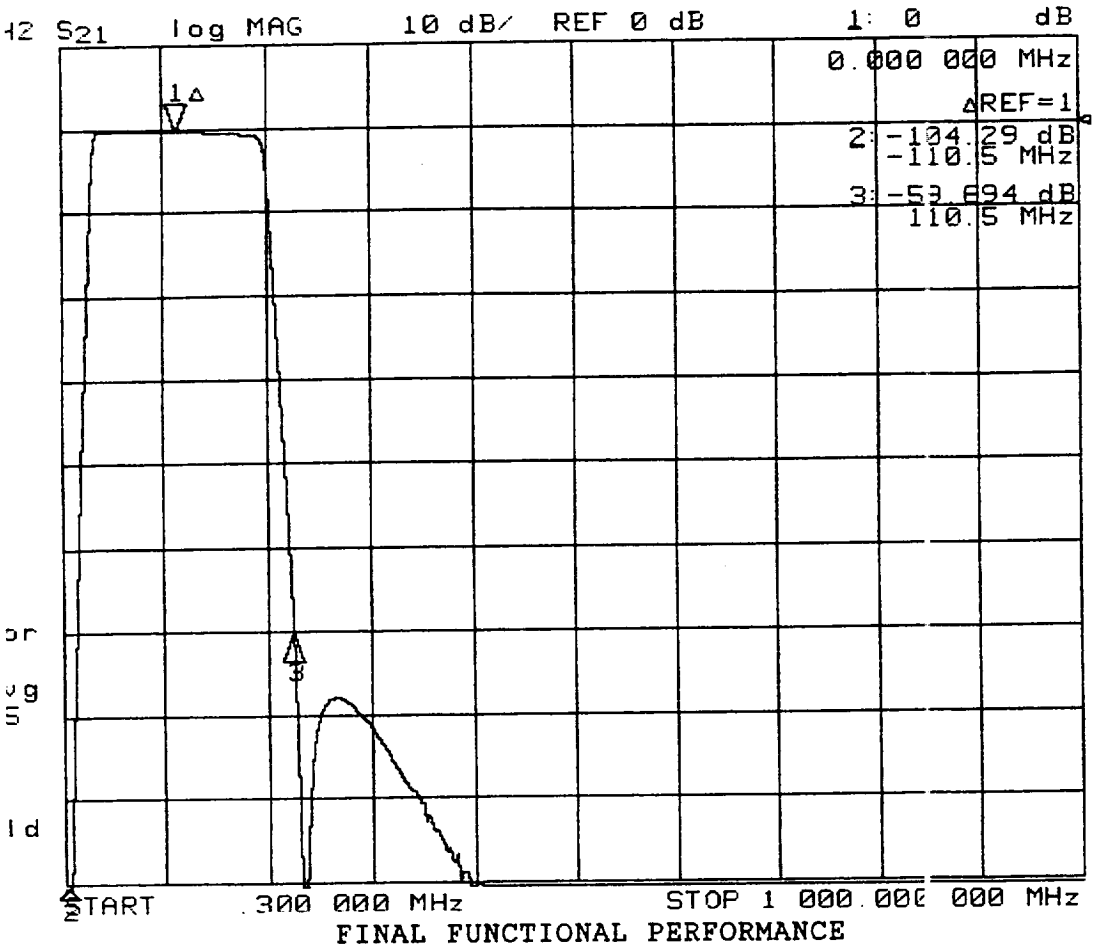
FINAL FUNCTIONAL PERFORMANCE
REJECTION PERFORMANCE
SERIAL NO. P231-004
-10C DATA
OPR: R. HOGGATT DATE DEC 21 1996

MARKER 1	1000.000000 MHz OFF	115.000000 MHz 0 dB
MARKER 2	1000.000000 MHz OFF	4.500000 MHz -101.27 dB
MARKER 3	1000.000000 MHz OFF	225.500000 MHz -57.89 dB
MARKER 4	1000.000000 MHz OFF	1000.000000 MHz OFF
MKR STIMULUS OFFSET	0.000000 MHz 0 dB	0.000000 MHz 0 dB
REFERENCE MARKER	OFF	MARKER 1
PLACEMENT	CONTINUOUS	CONTINUOUS
MARKER SEARCH	OFF	OFF
TARGET VALUE	-3 dB	-3 dB
MARKER WIDTH VALUE	-3 dB	-3 dB
	OFF	OFF
MARKER TRACKING	OFF	OFF



FINAL FUNCTIONAL PERFORMANCE
REJECTION PERFORMANCE
SERIAL NO. P231-004
+15C DATA
OPR: R. HOGGATT DATE DEC 21 1996

MARKER PARAMET	annel 2	
MARKER 1	1000.000000 MHz OFF	115.000000 MHz 0 dB
MARKER 2	1000.000000 MHz OFF	4.500000 MHz -98.276 dB
MARKER 3	1000.000000 MHz OFF	225.500000 MHz -58.859 dB
MARKER 4	1000.000000 MHz OFF	1000.000000 MHz OFF
MKR STIMULUS OFFSET	0.000000 MHz 0 dB	0.000000 MHz 0 dB
REFERENCE MARKER	OFF	MARKER 1
PLACEMENT	CONTINUOUS	CONTINUOUS
MARKER SEARCH	OFF	OFF
TARGET VALUE	-3 dB	-3 dB
MARKER WIDTH VALUE	-3 dB	-3 dB
	OFF	OFF
MARKER TRACKING	OFF	OFF



FINAL FUNCTIONAL PERFORMANCE
REJECTION PERFORMANCE
SERIAL NO. P231-004
+40C DATA
OPR: R. HOGGATT DATE DEC 21 1996

annel 2

ARKER 1	1000.000000 MHz OFF	115.000000 MHz 0 dB
ARKER 2	1000.000000 MHz OFF	4.500000 MHz -104.29 dB
ARKER 3	1000.000000 MHz OFF	225.500000 MHz -59.594 dB
ARKER 4	1000.000000 MHz OFF	1000.000000 MHz OFF
IKR STIMULUS OFFSET	0.000000 MHz 0 dB	0.000000 MHz 0 dB
EFERENCE MARKER	OFF	MARKER 1
LACEMENT	CONTINUOUS	CONTINUOUS
IARKER SEARCH	OFF	OFF
ARGET VALUE	-3 dB	-3 dB
IARKER WIDTH VALUE	-3 dB	-3 dB
	OFF	OFF
IARKER TRACKING	OFF	OFF

APPENDIX E **ACCEPTANCE TEST REPORT**

BANDPASS FILTER MODEL HL115-170-10SS1 S/N P231-004
AEROJET 1331559-5 REV. E

BANDPASS CHARACTERISTICS MEASUREMENT
PER ATP PARA 4.6
(REF: AE-24687 PARA 4.8.2)

RECORD THE AMBIENT ROOM TEMPERATURE: +25.5 °C (+19°C TO +29.0°C)

{15} ATTACH PASSBAND PERFORMANCE X-Y PLOT ✓ (√)

{24} TEST POINT MATRIX

REF	FREQ	UNIT	VALUE	REF	FREQ	UNIT	VALUE
F1	0.5	MHz	-103.0 dB	F11	(*) 130.0	MHz	-0.33 dB
F2	1.0	MHz	-105.8 dB	F12	(*) 155.0	MHz	-0.45 dB
F3	10.0	MHz	-79.5 dB	F13	180.0	MHz	-0.63 dB
F4	20.0	MHz	-38.5 dB	F14	190.0	MHz	-0.81 dB
F5	30.0	MHz	-6.59 dB	F15	200.0	MHz	-4.47 dB
F6	40.0	MHz	-0.26 dB	F16	210.0	MHz	-24.7 dB
F7	50.0	MHz	-0.22 dB	F17	300.0	MHz	-71.5 dB
F8	(*) 75.0	MHz	-0.26 dB	F18	400.0	MHz	-91.8 dB
F9	(*) 100.0	MHz	-0.27 dB	F19	500.0	MHz	-97.9 dB
F10	115.0	MHz	-0.30 dB	F20	1000.0	MHz	-99.2 dB

TEST PERFORMED BY: R. Hoggatt (DA 5) DATE 12/21/96

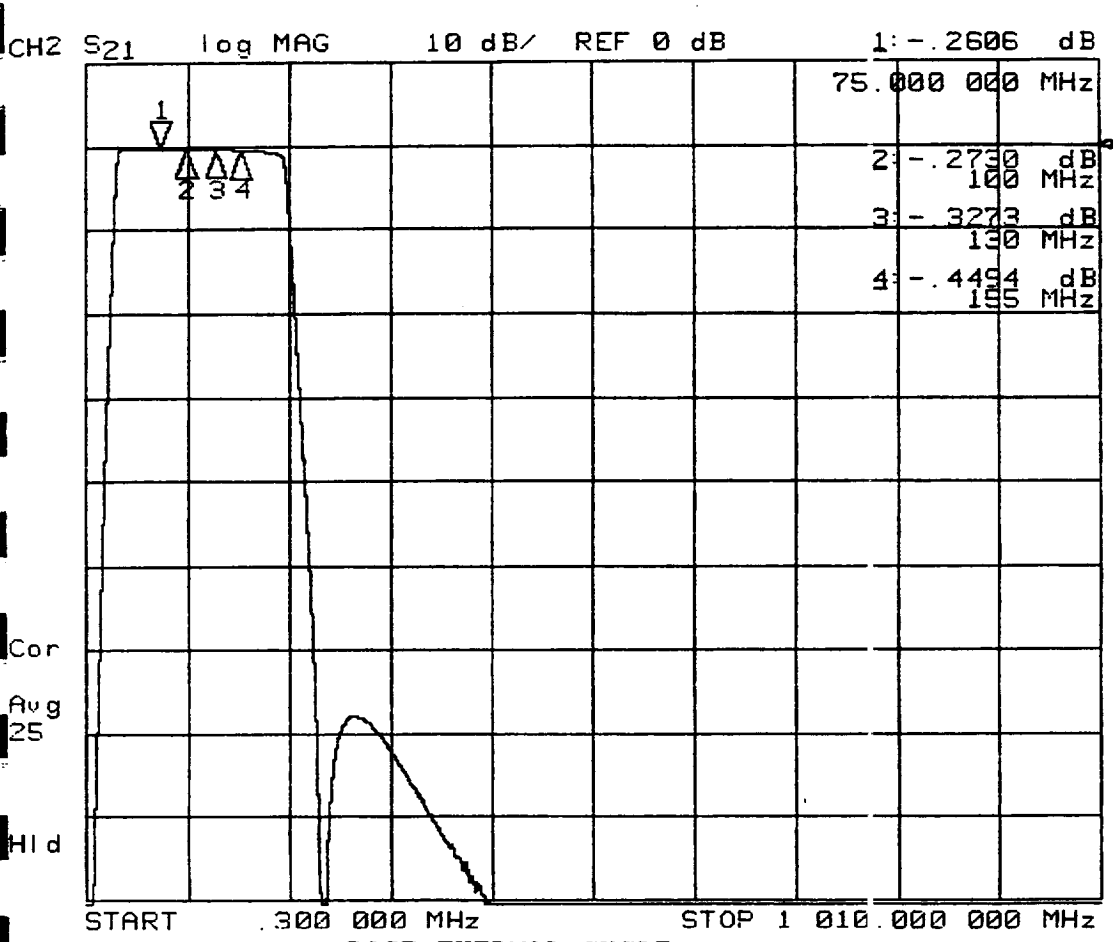
NOTE IF TEST WITNESSED BY AESD _____ GSI Not witnessed this time. DLD

***** END OF BANDPASS CHARACTERISTICS TEST *****

FUNCTIONAL PERFORMANCE TEST
ACCEPTANCE TEST PROCEDURE
63-0005-010 PARA 4.1

BRIEF TEST DESCRIPTION: THE TESTS DESCRIBED IN APPENDIX E PAGE 10 THRU PAGE 13 ARE PERFORMED TO DOCUMENT THE FUNCTIONAL PERFORMANCE OF THE UNIT AT THE CONCLUSION OF ALL ENVIRONMENTAL TESTING. THE TESTS ARE AS FOLLOWS AND IN ANY SEQUENCE:

a.) VSWR PER ATP PARA 4.5.1.
b.) INSERTION LOSS PER ATP PARA 4.5.2
c.) INSERTION LOSS VS TEMPERATURE PER ATP PARA 4.5.6.
d.) 3.0 dB BANDWIDTH PER ATP PARA 4.5.3.
e.) CENTER FREQUENCY (fc) PER ATP PARA 4.5.7 (PART OF 3.0 dB B/W TEST)
f.) PASSBAND RIPPLE PER ATP PARA 4.5.4 (PART OF INSERTION LOSS TEST).
g.) OUT-OF-BAND REJECTION PER ATP PARA 4.5.5.



POST THERMAL CYCLE
PASSBAND CHARACTERISTICS
SERIAL NO. P231-004
AMBIENT
MARKER PARAME OPR: R. HOGGATT DATE DEC 21 1998 annel 2

MARKER 1	17.750000 MHz	75.000000 MHz
	OFF	-.2606 dB
MARKER 2	157.250000 MHz	100.000000 MHz
	OFF	-.2730 dB
MARKER 3	29.375000 MHz	130.000000 MHz
	OFF	-.3273 dB
MARKER 4	145.625000 MHz	155.000000 MHz
	OFF	-.4494 dB
MKR STIMULUS OFFSET	0.000000 MHz	89.425802 MHz
	0 dB	-3.2342 dB
REFERENCE MARKER	OFF	OFF
PLACEMENT	CONTINUOUS	CONTINUOUS
MARKER SEARCH	OFF	OFF
TARGET VALUE	-14 dB	-3 dB
MARKER WIDTH VALUE	-3 dB	-3 dB
	OFF	OFF
MARKER TRACKING	OFF	OFF

Channel 6 Bandpass Filter

IF Filter (S/N: 1331559-2, S/N: P228-013)

APPENDIX B **ACCEPTANCE TEST REPORT**

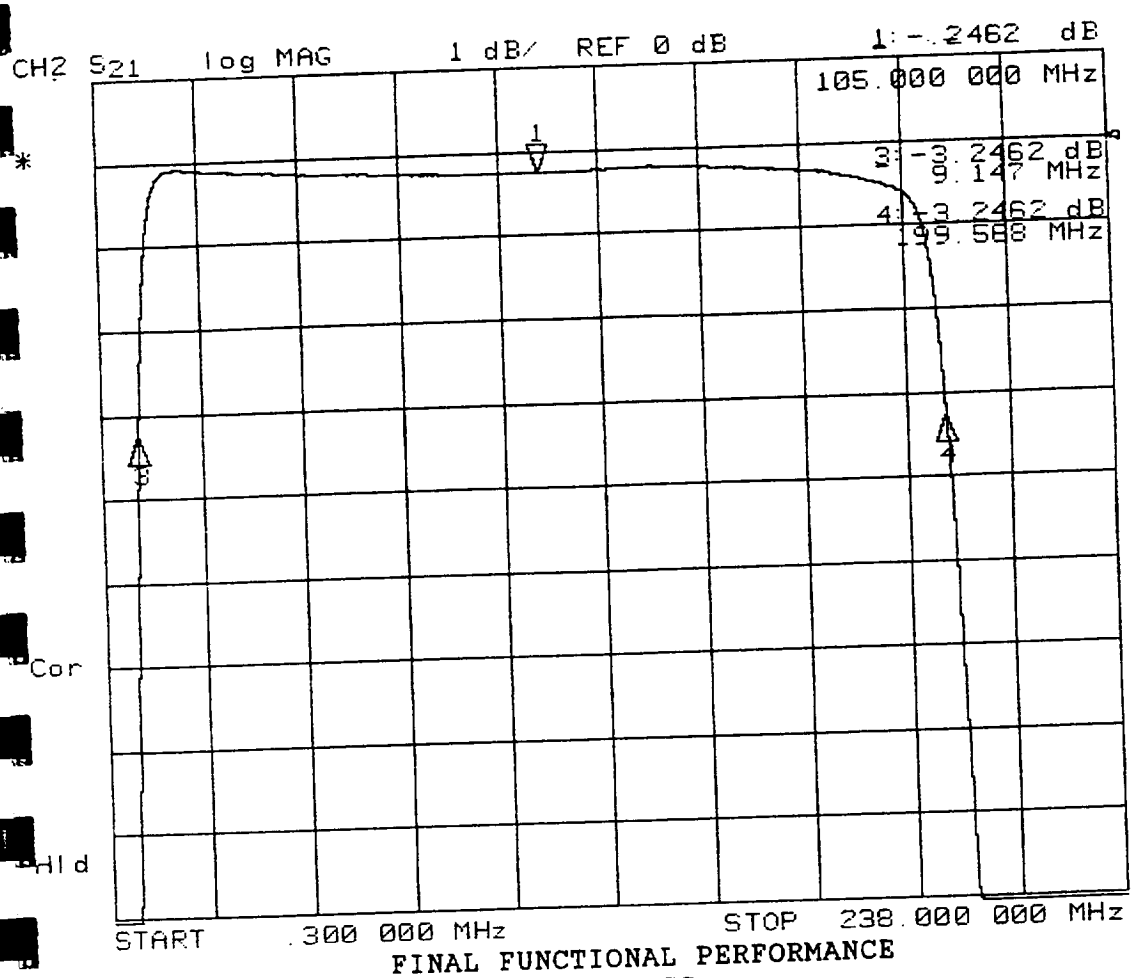
BANDPASS FILTER MODEL HL105-190-10SS1 S/N P228-013
AEROJET 1331559-2 REV. E

3.0 dB BANDWIDTH

ACCEPTANCE TEST PROCEDURE 63-0005-02 PARA 4.5.3	-10°C	+15°C	+40°C
{7} UPPER 3.0 dB BANDEDGE	199.57 MHz (198.0-200.0)	199.19 Mhz (198.0-200.0)	198.85 MHz (1480.01500.0)
{8} LOWER 3.0 dB BANDEDGE	9.15 MHz (8.0-10.0)	9.14 Mhz (8.0-10.0)	9.13 MHz (8.0-10.0)
{9} 3.0 dB RELATIVE BANDWIDTH	190.42 MHz (188.0-192.0)	190.05 Mhz (188.0-192.0)	189.72 MHz (188.0-192.0)
{10} ADD {7} AND {8} ÷ 2 =	104.36 MHz (105.0 NOM)	104.17 MHz (105.0 NOM)	103.99 Mhz (105.0 NOM)
{10a} RECORD MEASURED TEMPERATURE	-14.6 °C (-15.0 TO -10.0)	+15.7 °C (12.5 TO 17.5)	+43.5 °C (40.0 TO 45.0)
{6} ATTACH TRANSMISSION LOSS PERFORMANCE X-Y PLOT	✓ (√)	✓ (√)	✓ (√)

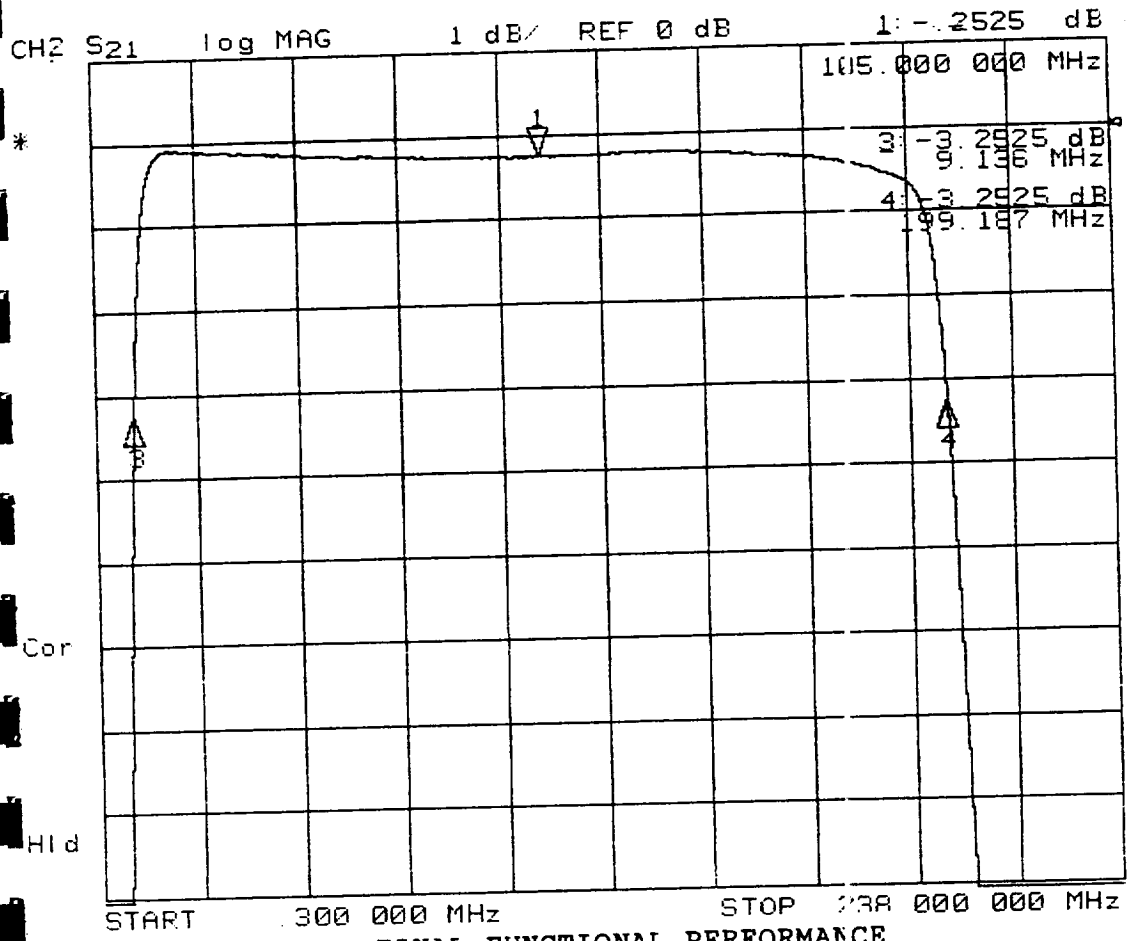
PASSBAND RIPPLE

ACCEPTANCE TEST PROCEDURE 63-0005-02 PARA 4.5.4	-10°C	+15°C	+40°C
{11a} MIN INSERTION LOSS FREQ	18.72 MHz	19.91 Mhz	20.50 MHz
MIN INSERTION LOSS PERFORMANCE	-0.08 dB	-0.08 dB	-0.09 dB
{11b} 75% BW LOWER BANDEDGE FREQ	13.94 MHz	3.79 Mhz	13.64 MHz
75% BW LOWER BANDEDGE I.L. PERF	-0.27 dB	-0.28 dB	-0.30 dB
{11c} 75% BW UPPER BANDEDGE FREQ	156.44 MHz	156.29 Mhz	156.14 MHz
75% BW UPPER BANDEDGE I.L. PERF	-0.27 dB	-0.28 dB	-0.30 dB
{11d} PERFORMANCE DELTA (I.L. @ {11b} - I.L. @ {11a})	0.19 dB	0.20 dB	0.21 dB
{11e} PERFORMANCE DELTA (I.L. @ {11c} - I.L. @ {11a})	0.19 dB	0.20 dB	0.21 dB



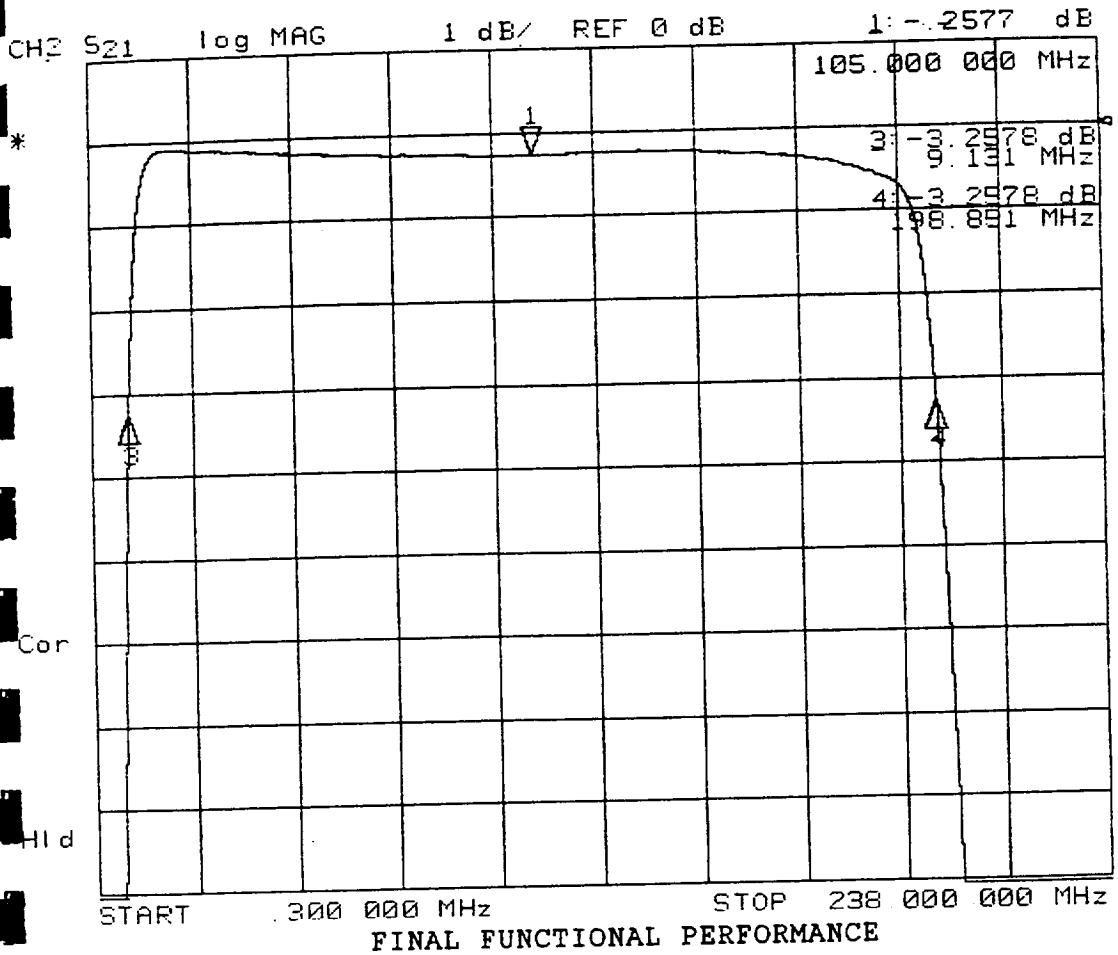
FINAL FUNCTIONAL PERFORMANCE
TRANSMISSION LOSS
SERIAL NO. P228-013
-10C DATA
OPR: R. HOGGATT DATE DEC 28 1996 annel 2

MARKER PARAMET		
MARKER 1	19.500000 MHz OFF	105.000000 MHz -.2462 dB
MARKER 2	190.500000 MHz OFF	104.358066 MHz OFF
MARKER 3	33.750000 MHz OFF	9.147530 MHz -3.2462 dB
MARKER 4	176.250000 MHz OFF	199.568602 MHz -3.2462 dB
MKR STIMULUS OFFSET	0.000000 MHz 0 dB	89.425802 MHz -3.2342 dB
REFERENCE MARKER	OFF	OFF
PLACEMENT	CONTINUOUS	CONTINUOUS
MARKER SEARCH	OFF	OFF
TARGET VALUE	-14 dB	-3 dB
MARKER WIDTH VALUE	-3 dB	-3 dB
	OFF	OFF
MARKER TRACKING	OFF	OFF



FINAL FUNCTIONAL PERFORMANCE
TRANSMISSION LOSS
SERIAL NO. P228-013
+15C DATA
OPR: R. HOGGATT DATE DEC 2 8 1996 annel 2

MARKER PARAMET		
MARKER 1	19.500000 MHz OFF	105.000000 MHz -.2525 dB
MARKER 2	190.500000 MHz OFF	104.162064 MHz OFF
MARKER 3	33.750000 MHz OFF	9.136955 MHz -3.2525 dB
MARKER 4	176.250000 MHz OFF	199.187173 MHz -3.2525 dB
MKR STIMULUS OFFSET	0.000000 MHz 0 dB	89.425802 MHz -3.2342 dB
REFERENCE MARKER	OFF	OFF
PLACEMENT	CONTINUOUS	CONTINUOUS
MARKER SEARCH	OFF	OFF
TARGET VALUE	-14 dB	-3 dB
MARKER WIDTH VALUE	-3 dB	-3 dB
	OFF	OFF
MARKER TRACKING	OFF	OFF



FINAL FUNCTIONAL PERFORMANCE
TRANSMISSION LOSS
SERIAL NO. P228-013
+40C DATA
OPR: R. HOGGATT DATE DEC 28 1996 annel 2

MARKER PARAMET		
MARKER 1	19.500000 MHz OFF	105.000000 MHz -.2577 dB
MARKER 2	190.500000 MHz OFF	103.991412 MHz OFF
MARKER 3	33.750000 MHz OFF	9.131073 MHz -3.2578 dB
MARKER 4	176.250000 MHz OFF	198.851752 MHz -3.2578 dB
MKR STIMULUS OFFSET	0.000000 MHz 0 dB	89.425802 MHz -3.2342 dB
REFERENCE MARKER	OFF	OFF
PLACEMENT	CONTINUOUS	CONTINUOUS
MARKER SEARCH	OFF	OFF
TARGET VALUE	-14 dB	-3 dB
MARKER WIDTH VALUE	-3 dB	-3 dB
	OFF	OFF
MARKER TRACKING	OFF	OFF

APPENDIX B **ACCEPTANCE TEST REPORT**

BANDPASS FILTER MODEL HL105-190-10SS1 S/N P228-013
AEROJET 1331559-2 REV. E

PASSBAND RIPPLE (CON'T)

{11f} RECORD PASS/FAIL (0.5 dB MAX)	(PASS)/FAIL	(PASS)/FAIL	(PASS)/FAIL
{11g) ATTACH PASSBAND RIPPLE PERFORMANCE X-Y PLOT(S)	✓ (√)	✓ (√)	✓ (√)

OUT-OF-BAND REJECTION
ACCEPTANCE TEST PROCEDURE
63-0005-02 PARA 4.5.5
Fc=105.0 MHz.
REF {5A} FOR INSERTION LOSS @ Fc

	-10°C	+15°C	+40°C
{12} WORST CASE REJECTION FROM 0.300 MHz TO 1.0 MHz	-59.2 dB (40.0 dB MIN)	-59.2 dB (40.0 dB MIN)	-59.2 dB (40.0 dB MIN)
{13a} WORST CASE REJECTION FROM 228.5 MHz TO 1000.0 MHz	-41.4 dB (40.0 dB MIN)	-41.4 dB (40.0 dB MIN)	-41.5 dB (40.0 dB MIN)
{13c} RECORD MEASURED TEMPERATURE	-14.8 °C (-15.0 TO -10.0)	+15.6 °C (12.5 TO 17.5)	+43.7 °C (40.0 TO 45.0)
{14} ATTACH REJECTION PERFORMANCE X-Y PLOT(S)	✓ (√) ✓ (√)	✓ (√) ✓ (√)	✓ (√) ✓ (√)

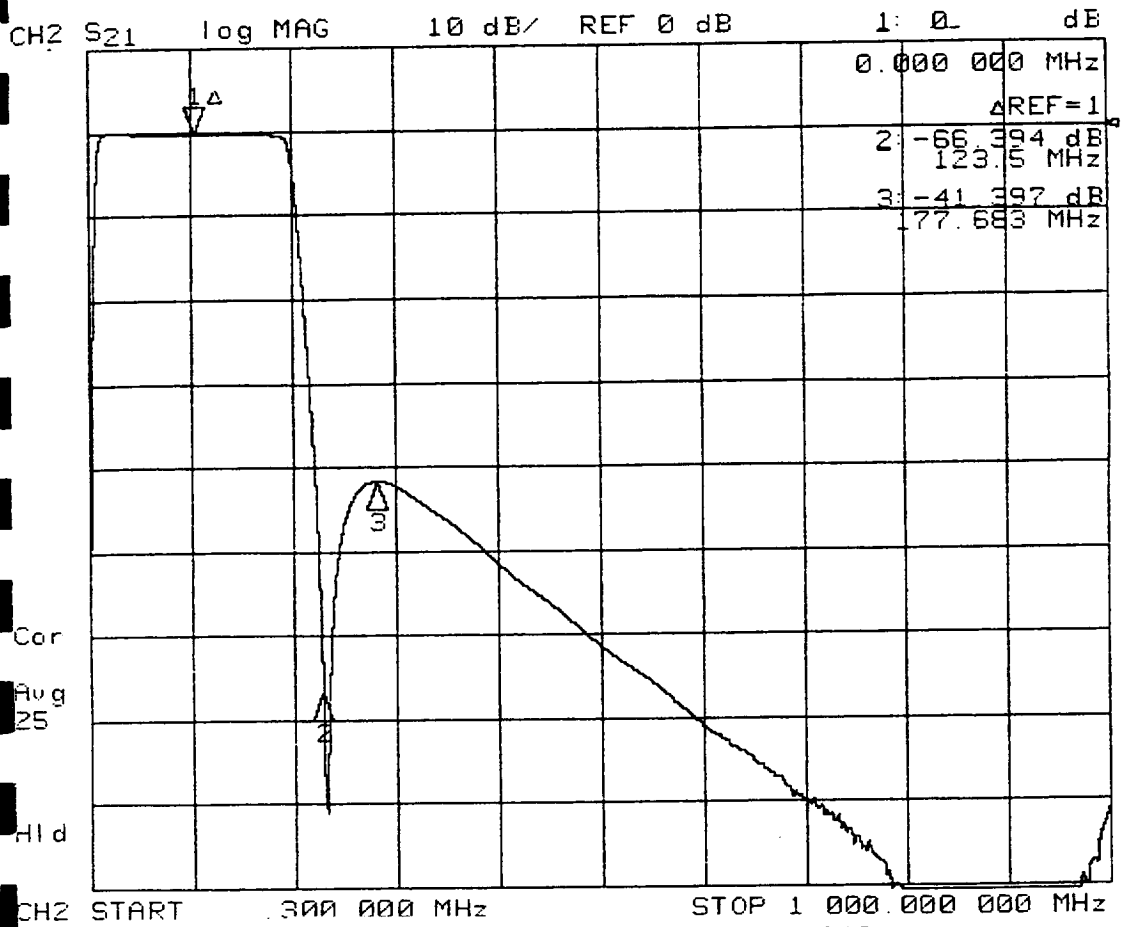
TEST PERFORMED BY R. Hoggatt DATE 12/28/96

NOTE IF TEST WITNESSED BY AESD: _____ GSI: Not witnessed this time. DLD

***** END OF FUNCTIONAL PERFORMANCE TEST ****

OUTLINE AND MOUNTING DIMENSIONS VERIFICATION
{16} REFERENCE CUSTOMER DRAWING 1331559

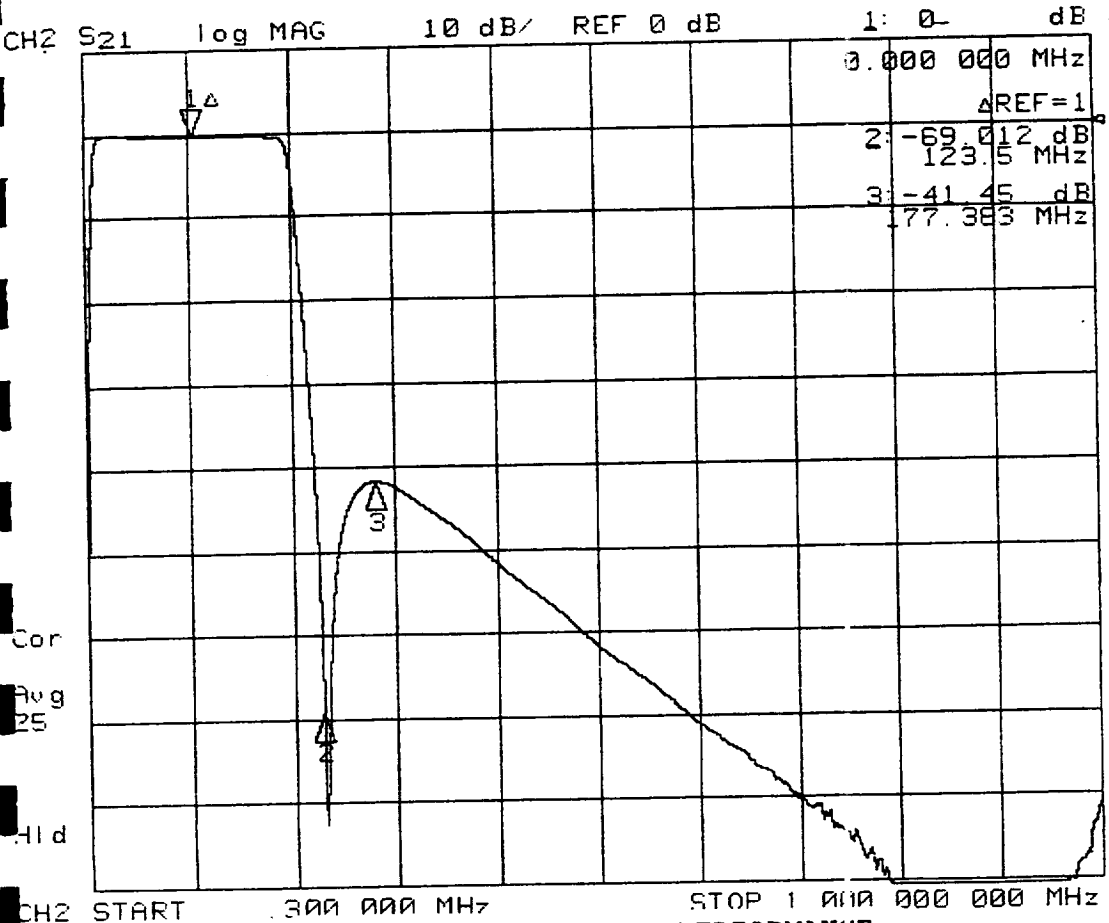
DESCRIPTION OF MEASUREMENT	DIMENSION AND TOLERANCE	ACTUAL MEASUREMENT
OVER ALL LENGTH	3.50 ± .03	3.502
MOUNTING HOLE CENTER	0.125 ± .010	0.127
BETWEEN UPPER MOUNTING HOLES	3.250	3.250
BETWEEN LOWER MOUNTING HOLES	3.250	3.250



FINAL FUNCTIONAL PERFORMANCE
REJECTION PERFORMANCE
SERIAL NO. P228-013
-10C DATA

MARKER PARAMET **OPR: R. HOGGATT DATE** DEC 28 1996 annel 2

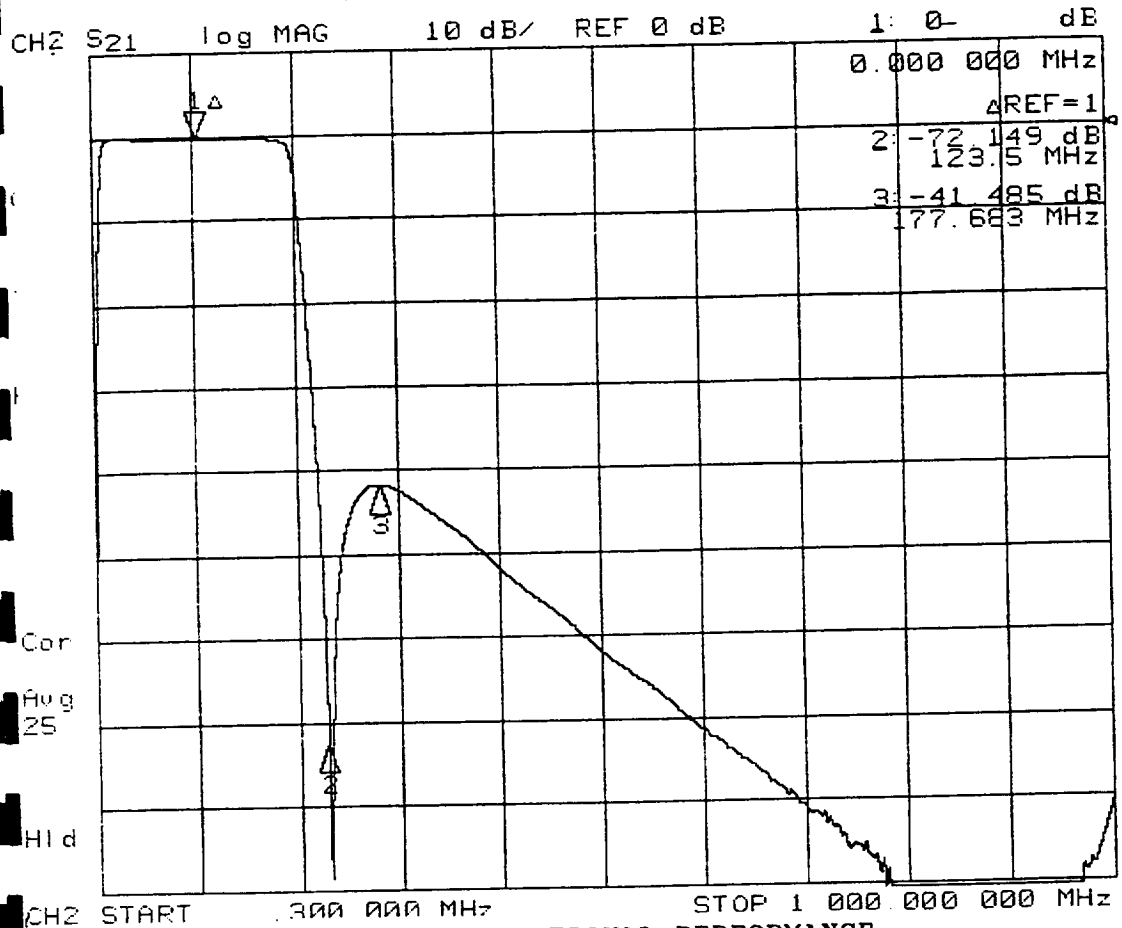
MARKER 1	1.000000 MHz OFF	105.000000 MHz 0 dB
MARKER 2	5.000000 MHz OFF	228.500000 MHz -66.394 dB
MARKER 3	5.000000 MHz OFF	282.683742 MHz -41.397 dB
MARKER 4	5.000000 MHz OFF	.300000 MHz OFF
MKR STIMULUS OFFSET	0.000000 MHz 0 dB	0.000000 MHz 0 dB
REFERENCE MARKER	OFF	MARKER 1
PLACEMENT	CONTINUOUS	CONTINUOUS
MARKER SEARCH	OFF	OFF
TARGET VALUE	-3 dB	-3 dB
MARKER WIDTH VALUE	-3 dB	-3 dB
	OFF	OFF
MARKER TRACKING	OFF	OFF



FINAL FUNCTIONAL PERFORMANCE
REJECTION PERFORMANCE
SERIAL NO. P228-013
+15C DATA
OPR: R. HOGGATT DATE DEC 28 1996

annel 2

MARKER PARAMET		
MARKER 1	1.000000 MHz OFF	105.000000 MHz 0 dB
MARKER 2	5.000000 MHz OFF	228.500000 MHz -69.012 dB
MARKER 3	5.000000 MHz OFF	282.383832 MHz -41.45 dB
MARKER 4	5.000000 MHz OFF	.300000 MHz OFF
MKR STIMULUS OFFSET	0.000000 MHz 0 dB	0.000000 MHz 0 dB
REFERENCE MARKER	OFF	MARKER 1
PLACEMENT	CONTINUOUS	CONTINUOUS
MARKER SEARCH	OFF	OFF
TARGET VALUE	-3 dB	-3 dB
MARKER WIDTH VALUE	-3 dB	-3 dB
	OFF	OFF
MARKER TRACKING	OFF	OFF



FINAL FUNCTIONAL PERFORMANCE
REJECTION PERFORMANCE
SERIAL NO. P228-013
+40C DATA
OPR: R. HOGGATT DATE DEC 28 1996 annel 2

MARKER PARAMET		
MARKER 1	1.000000 MHz OFF	105.000000 MHz 0 dB
MARKER 2	5.000000 MHz OFF	228.500000 MHz -72.149 dB
MARKER 3	5.000000 MHz OFF	282.683742 MHz -41.485 dB
MARKER 4	5.000000 MHz OFF	.300000 MHz OFF
MKR STIMULUS OFFSET	0.000000 MHz 0 dB	0.000000 MHz 0 dB
REFERENCE MARKER	OFF	MARKER 1
PLACEMENT	CONTINUOUS	CONTINUOUS
MARKER SEARCH	OFF	OFF
TARGET VALUE	-3 dB	-3 dB
MARKER WIDTH VALUE	-3 dB	-3 dB
	OFF	OFF
MARKER TRACKING	OFF	OFF

APPENDIX B **ACCEPTANCE TEST REPORT**

BANDPASS FILTER MODEL HL105-190-10SS1 S/N P228-013
AEROJET 1331559-2 REV. E

BANDPASS CHARACTERISTICS MEASUREMENT
PER ATP PARA 4.6
(REF: AE-24687, PARA 4.8.2)

RECORD THE AMBIENT ROOM TEMPERATURE. +23.1 °C (+19°C TO +29.0°C)

{15} ATTACH PASSBAND PERFORMANCE X-Y PLOT ✓ (√)

{24} TEST POINT MATRIX

REF	FREQ	UNIT	VALUE	REF	FREQ	UNIT	VALUE
F1	0.5	MHz	-83.2 dB	F11	(*) 130.0	MHz	-0.23 dB
F2	1.0	MHz	-66.6 dB	F12	(*) 150.0	MHz	-0.25 dB
F3	5.0	MHz	-17.8 dB	F13	180.0	MHz	-0.43 dB
F4	7.5	MHz	-7.43 dB	F14	190.0	MHz	-0.63 dB
F5	10.0	MHz	-1.81 dB	F15	200.0	MHz	-4.11 dB
F6	20.0	MHz	-0.08 dB	F16	250.0	MHz	-46.6 dB
F7	40.0	MHz	-0.11 dB	F17	300.0	MHz	-42.4 dB
F8	(*) 60.0	MHz	-0.19 dB	F18	400.0	MHz	-51.7 dB
F9	(*) 80.0	MHz	-0.25 dB	F19	500.0	MHz	-61.7 dB
F10	105.0	MHz	-0.25 dB	F20	1000.0	MHz	-80.6 dB

TEST PERFORMED BY: R. Hoggatt (D.) DATE 12/27/96

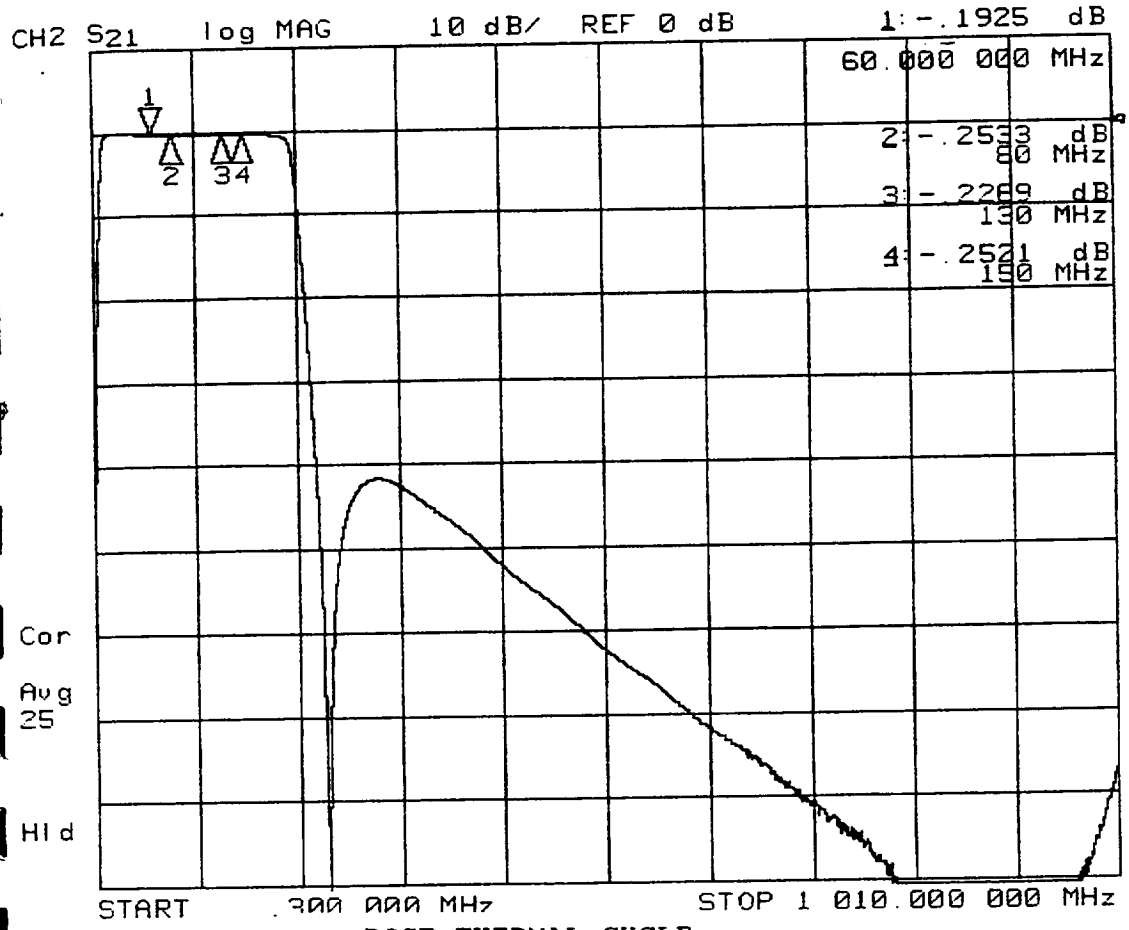
NOTE IF TEST WITNESSED BY AESD_____ GSI _ Not witnessed this time. DLD

***** END OF BANDPASS CHARACTERISTICS TEST *****

FUNCTIONAL PERFORMANCE TEST
ACCEPTANCE TEST PROCEDURE
63-0005-02 PARA 4.1

BRIEF TEST DESCRIPTION: THE TESTS DESCRIBED IN APPENDIX B PAGE 10 THRU PAGE 13 ARE PERFORMED TO DOCUMENT THE FUNCTIONAL PERFORMANCE OF THE UNIT AT THE CONCLUSION OF ALL ENVIRONMENTAL TESTING. THE TESTS ARE AS FOLLOWS AND IN ANY SEQUENCE:

a.) VSWR PER ATP PARA 4.5.1.
b.) INSERTION LOSS PER ATP PARA 4.5.2
c.) INSERTION LOSS VS TEMPERATURE PER ATP PARA 4.5.6.
d.) 3.0 dB BANDWIDTH PER ATP PARA 4.5.3.
e.) CENTER FREQUENCY (fc) PER ATP PARA 4.5.7 (PART OF 3.0 dB B/W TEST)
f.) PASSBAND RIPPLE PER ATP PARA 4.5.4 (PART OF INSERTION LOSS TEST).
g.) OUT-OF-BAND REJECTION PER ATP PARA 4.5.5.



POST THERMAL CYCLE
PASSBAND CHARACTERISTICS
SERIAL NO. P228-013
AMBIENT
OPR: R. HOGGATT DATE DEC 27 1996 annel 2

MARKER PARAME		
MARKER 1	17.750000 MHz OFF	60.000000 MHz -.1925 dB
MARKER 2	157.250000 MHz OFF	80.000000 MHz -.2533 dB
MARKER 3	29.375000 MHz OFF	130.000000 MHz -.2269 dB
MARKER 4	145.625000 MHz OFF	150.000000 MHz -.2521 dB
MKR STIMULUS OFFSET	0.000000 MHz 0 dB	89.425802 MHz -3.2342 dB
REFERENCE MARKER	OFF	OFF
PLACEMENT	CONTINUOUS	CONTINUOUS
MARKER SEARCH	OFF	OFF
TARGET VALUE	-14 dB	-3 dB
MARKER WIDTH VALUE	-3 dB	-3 dB
	OFF	OFF
MARKER TRACKING	OFF	OFF

Channel 7 Bandpass Filter

IF Filter (S/N: 1331559-2, S/N: P228-010)

APPENDIX B **ACCEPTANCE TEST REPORT**

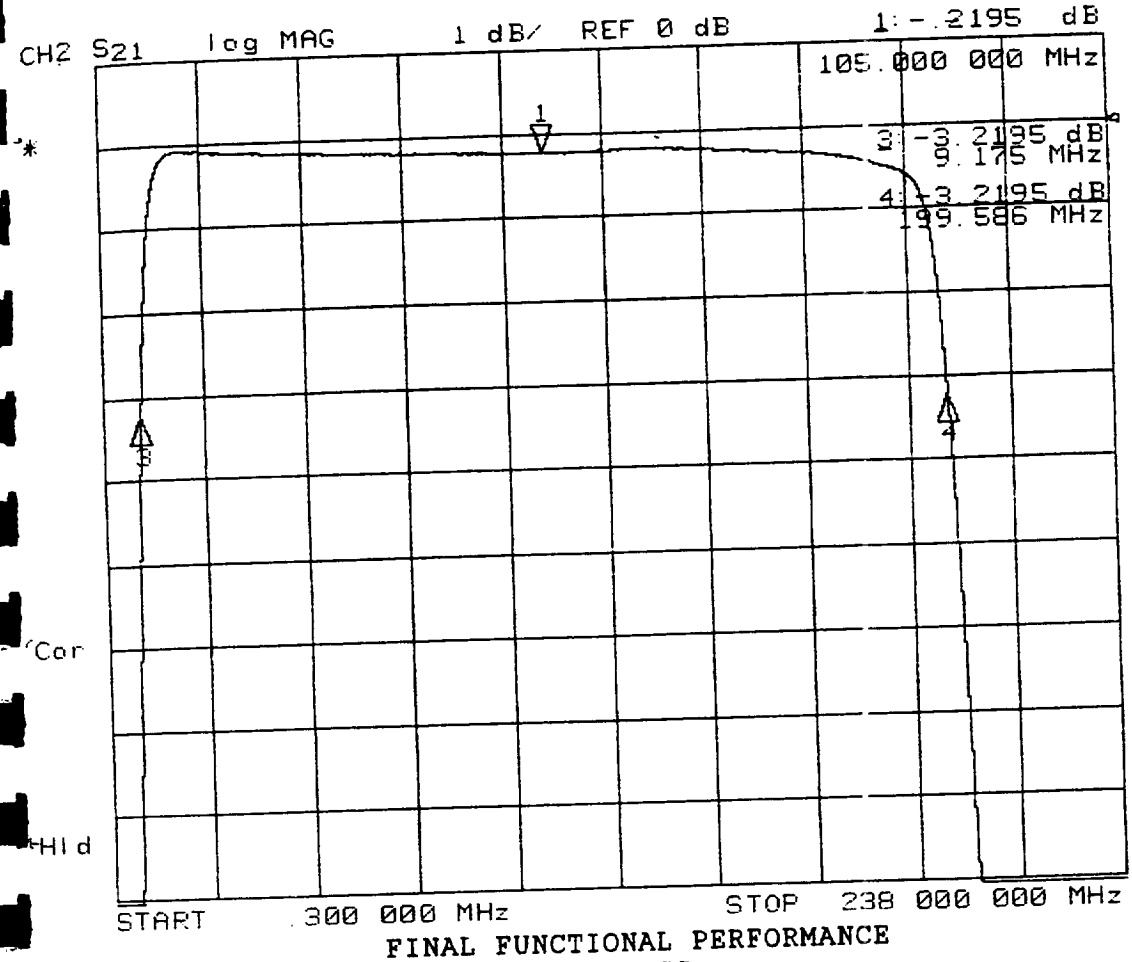
BANDPASS FILTER MODEL HL105-190-10SS1 S/N P228-010
AEROJET 1331559-2 REV. F

3.0 dB BANDWIDTH

ACCEPTANCE TEST PROCEDURE 63-0005-02 PARA 4.5.3	-10°C	+15°C	+40°C
{7} UPPER 3.0 dB BANDEDGE	199.59 MHz (198.0-200.0)	199.26 Mhz (198.0-200.0)	198.92 MHz (1480.01500.0)
{8} LOWER 3.0 dB BANDEDGE	9.18 MHz (8.0-10.0)	9.17 Mhz (8.0-10.0)	9.15 MHz (8.0-10.0)
{9} 3.0 dB RELATIVE BANDWIDTH	190.41 MHz (188.0-192.0)	190.09 Mhz (188.0-192.0)	189.77 MHz (188.0-192.0)
{10} ADD {7} AND {8} ÷ 2 =	104.39 MHz (105.0 NOM)	104.22 MHz (105.0 NOM)	104.04 Mhz (105.0 NOM)
{10a} RECORD MEASURED TEMPERATURE	-14.2 °C (-15.0 TO -10.0)	+13.5 °C (12.5 TO 17.5)	+43.1 °C (40.0 TO 45.0)
{6} ATTACH TRANSMISSION LOSS PERFORMANCE X-Y PLOT	✓ (√)	✓ (√)	✓ (√)

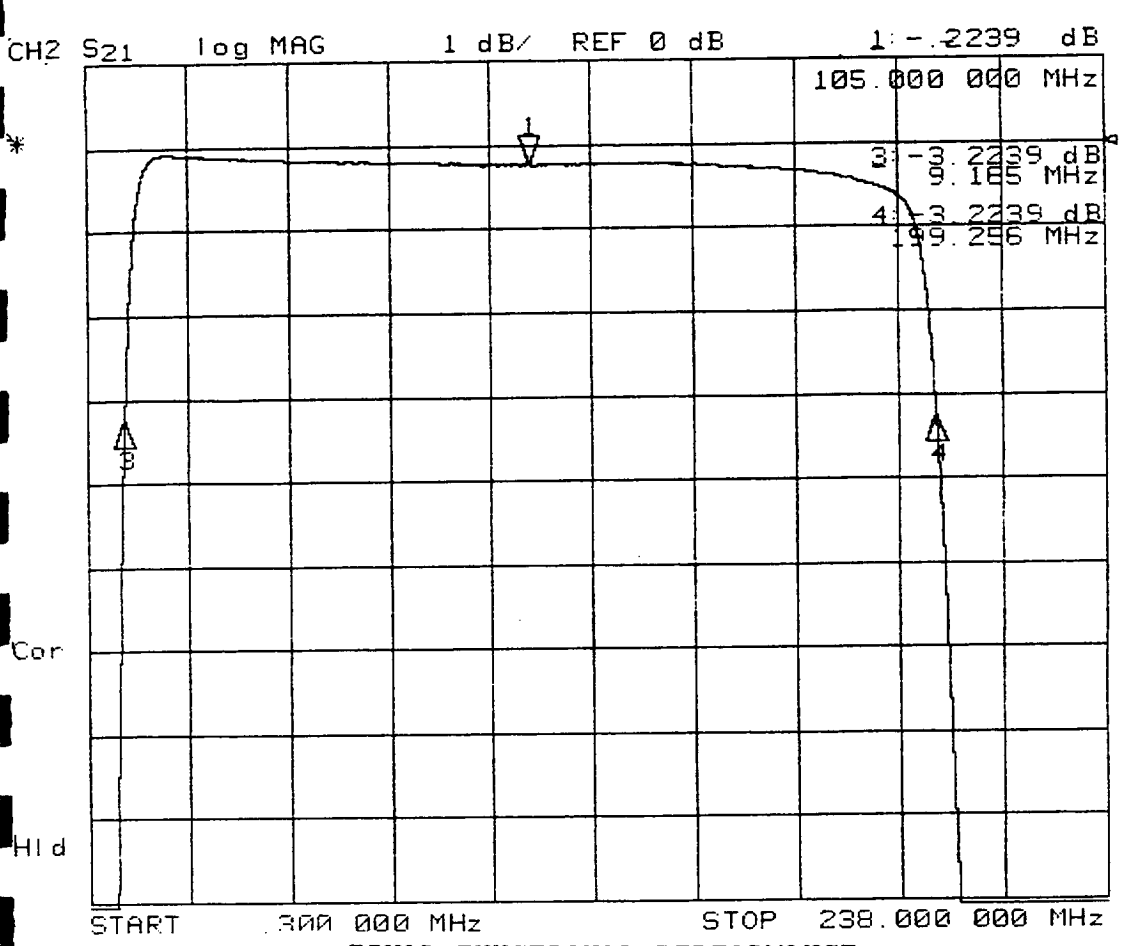
PASSBAND RIPPLE

ACCEPTANCE TEST PROCEDURE 63-0005-02 PARA 4.5.4	-10°C	+15°C	+40°C
{11a} MIN INSERTION LOSS FREQ	20.50 MHz	19.91 Mhz	19.91 MHz
MIN INSERTION LOSS PERFORMANCE	-0.08 dB	-0.08 dB	-0.08 dB
{11b} 75% BW LOWER BANDEDGE FREQ	13.96 MHz	13.81 Mhz	13.68 MHz
75% BW LOWER BANDEDGE I.L. PERF	-0.26 dB	-0.28 dB	-0.30 dB
{11c} 75% BW UPPER BANDEDGE FREQ	156.46 MHz	156.31 Mhz	156.18 MHz
75% BW UPPER BANDEDGE I.L. PERF	-0.26 dB	-0.28 dB	-0.30 dB
{11d} PERFORMANCE DELTA (I.L. @ {11b} - I.L. @ {11a})	0.18 dB	0.20 dB	0.22 dB
{11e} PERFORMANCE DELTA (I.L. @ {11c} - I.L. @ {11a})	0.18 dB	0.20 dB	0.22 dB



FINAL FUNCTIONAL PERFORMANCE
TRANSMISSION LOSS
SERIAL NO. P228-010
-10C DATA
OPR: R. HOGGATT DATE DEC 28 1996 annel 2

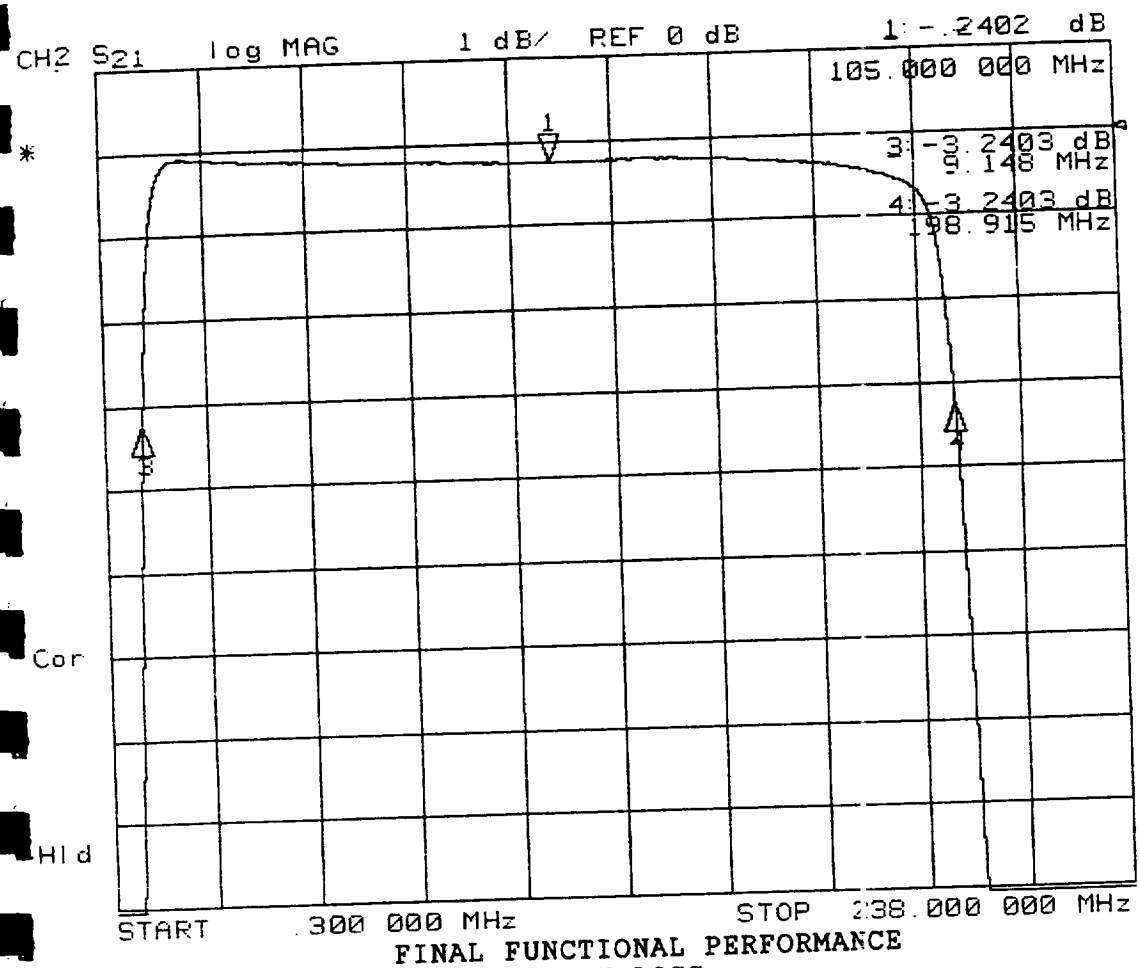
MARKER PARAMET		
MARKER 1	19.500000 MHz OFF	105.000000 MHz -.2195 dB
MARKER 2	190.500000 MHz OFF	104.381202 MHz OFF
MARKER 3	33.750000 MHz OFF	9.175747 MHz -3.2195 dB
MARKER 4	176.250000 MHz OFF	199.586658 MHz -3.2195 dB
MKR STIMULUS OFFSET	0.000000 MHz 0 dB	89.425802 MHz -3.2342 dB
REFERENCE MARKER	OFF	OFF
PLACEMENT	CONTINUOUS	CONTINUOUS
MARKER SEARCH	OFF	OFF
TARGET VALUE	-14 dB	-3 dB
MARKER WIDTH VALUE	-3 dB	-3 dB
	OFF	OFF
MARKER TRACKING	OFF	OFF



FINAL FUNCTIONAL PERFORMANCE
TRANSMISSION LOSS
SERIAL NO. P228-010
+15C DATA
OPR: R. HOGGATT DATE DEC 28 1995 annel 2

MARKER PARAME

MARKER 1	19.500000 MHz OFF	105.000000 MHz -.2239 dB
MARKER 2	190.500000 MHz OFF	104.211394 MHz OFF
MARKER 3	33.750000 MHz OFF	9.165957 MHz -3.2239 dB
MARKER 4	176.250000 MHz OFF	199.256832 MHz -3.2239 dB
MKR STIMULUS OFFSET	0.000000 MHz 0 dB	89.425802 MHz -3.2342 dB
REFERENCE MARKER	OFF	OFF
PLACEMENT	CONTINUOUS	CONTINUOUS
MARKER SEARCH	OFF	OFF
TARGET VALUE	-14 dB	-3 dB
MARKER WIDTH VALUE	-3 dB	-3 dB
	OFF	OFF
MARKER TRACKING	OFF	OFF



FINAL FUNCTIONAL PERFORMANCE
TRANSMISSION LOSS
SERIAL NO. P228-010
+40C DATA
OPR: R. HOGGATT DATE DEC 2 6 1996 annel 2

MARKER PARAMET		
MARKER 1	19.500000 MHz OFF	105.000000 MHz -.2402 dB
MARKER 2	190.500000 MHz OFF	104.032082 MHz OFF
MARKER 3	33.750000 MHz OFF	9.148991 MHz -3.2403 dB
MARKER 4	176.250000 MHz OFF	198.915173 MHz -3.2403 dB
MKR STIMULUS OFFSET	0.000000 MHz 0 dB	89.425802 MHz -3.2342 dB
REFERENCE MARKER	OFF	OFF
PLACEMENT	CONTINUOUS	CONTINUOUS
MARKER SEARCH	OFF	OFF
TARGET VALUE	-14 dB	-3 dB
MARKER WIDTH VALUE	-3 dB	-3 dB
	OFF	OFF
MARKER TRACKING	OFF	OFF

APPENDIX B **ACCEPTANCE TEST REPORT**

BANDPASS FILTER MODEL HL105-190-10SS1 S/N P228-010
AEROJET 1331559-2 REV. E

PASSBAND RIPPLE (CON'T)

{11f} RECORD PASS/FAIL (0.5 dB MAX)	(PASS)/FAIL	(PASS)/FAIL	(PASS)/FAIL
{11g) ATTACH PASSBAND RIPPLE PERFORMANCE X-Y PLOT(S)	✓ (√)	✓ (√)	✓ (√)

OUT-OF-BAND REJECTION

ACCEPTANCE TEST PROCEDURE
63-0005-02 PARA 4.5.5
Fc=105.0 MHz.
REF {5A} FOR INSERTION LOSS @ Fc

	-10°C	+15°C	+40°C
{12} WORST CASE REJECTION FROM 0.300 MHz TO 1.0 MHz	-59.3 dB (40.0 dB MIN)	-59.3 dB (40.0 dB MIN)	-59.2 dB (40.0 dB MIN)
{13a} WORST CASE REJECTION FROM 228.5 MHz TO 1000.0 MHz	-42.2 dB (40.0 dB MIN)	-42.3 dB (40.0 dB MIN)	-42.3 dB (40.0 dB MIN)
{13c} RECORD MEASURED TEMPERATURE	-14.3 °C (-15.0 TO -10.0)	+14.0 °C (12.5 TO 17.5)	+43.1 °C (40.0 TO 45.0)
{14} ATTACH REJECTION PERFORMANCE X-Y PLOT(S)	✓ (√) (√)	✓ (√) (√)	✓ (√) (√)

TEST PERFORMED BY R. Hoggatt DATE 12/28/96

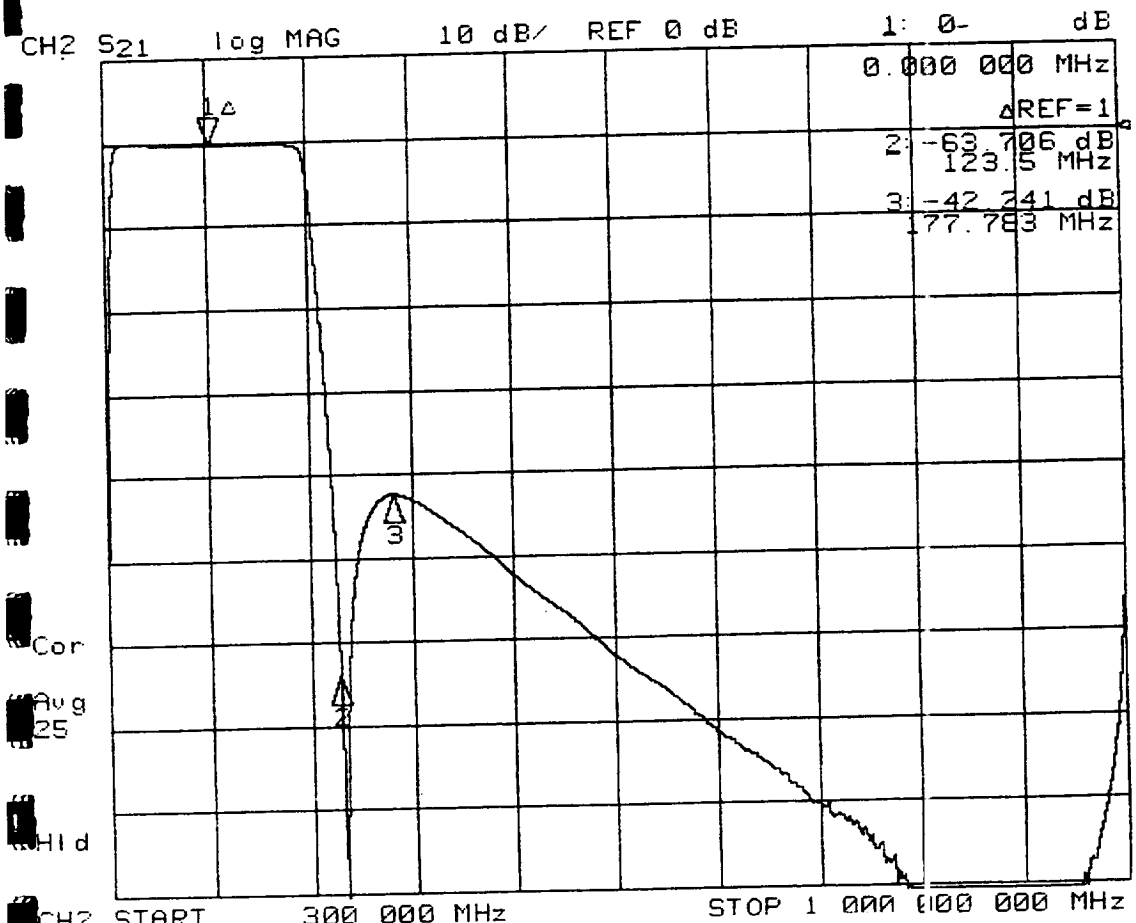
NOTE IF TEST WITNESSED BY AESD: _____ GSI: Not witnessed this time. DLD

***** END OF FUNCTIONAL PERFORMANCE TEST ****

OUTLINE AND MOUNTING DIMENSIONS VERIFICATION

{16} REFERENCE CUSTOMER DRAWING 1331559

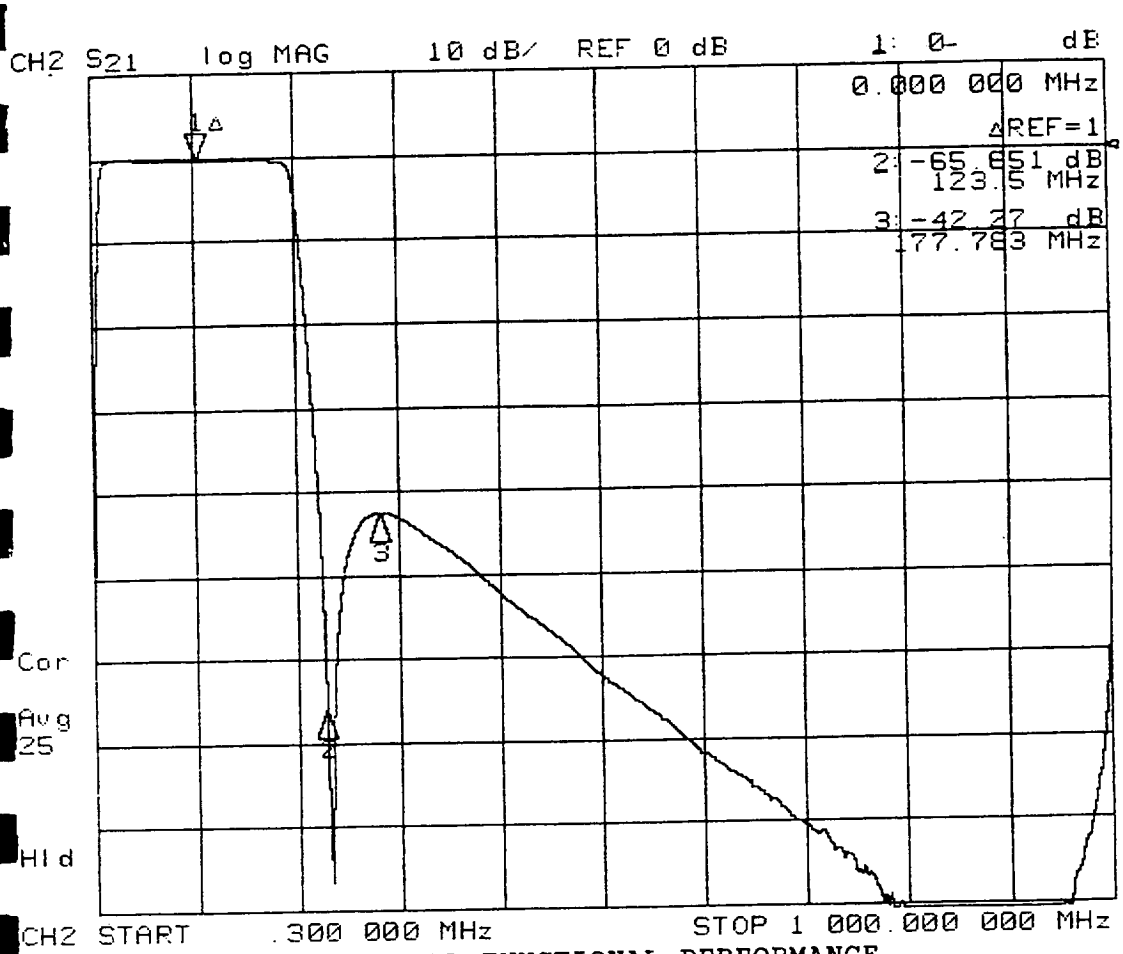
DESCRIPTION OF MEASUREMENT	DIMENSION AND TOLERANCE	ACTUAL MEASUREMENT
OVER ALL LENGTH	3.50 ± .03	3.501
MOUNTING HOLE CENTER	0.125 ± .010	0.126
BETWEEN UPPER MOUNTING HOLES	3.250	3.249
BETWEEN LOWER MOUNTING HOLES	3.250	3.250



FINAL FUNCTIONAL PERFORMANCE
REJECTION PERFORMANCE
SERIAL NO. P228-010
-10C DATA
OPR: R. HOGGATT DATE DEC 28 1996

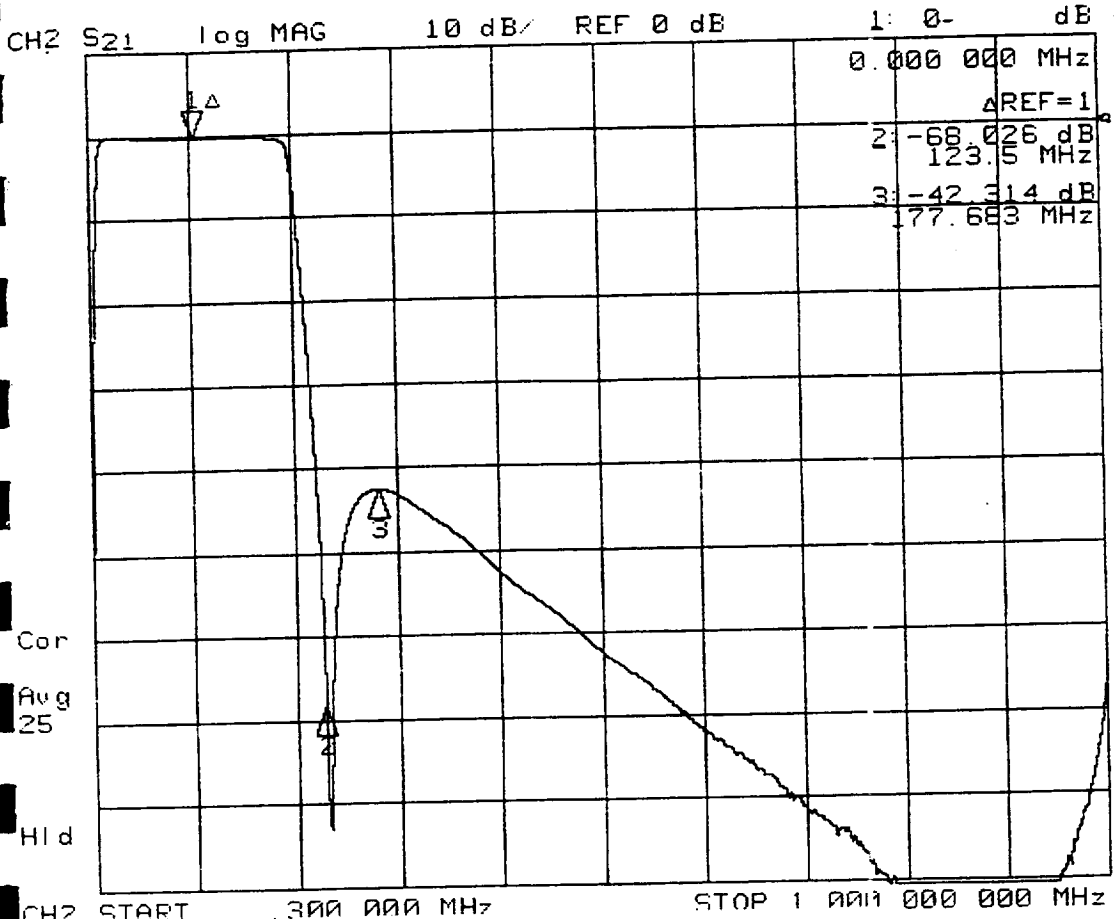
annel 2

MARKER PARAMET		
MARKER 1	1.000000 MHz OFF	105.000000 MHz 0 dB
MARKER 2	5.000000 MHz OFF	228.500000 MHz -63.706 dB
MARKER 3	5.000000 MHz OFF	282.783712 MHz -42.241 dB
MARKER 4	5.000000 MHz OFF	.300000 MHz OFF
MKR STIMULUS OFFSET	0.000000 MHz 0 dB	0.000000 MHz 0 dB
REFERENCE MARKER	OFF	MARKER 1
PLACEMENT	CONTINUOUS	CONTINUOUS
MARKER SEARCH	OFF	OFF
TARGET VALUE	-3 dB	-3 dB
MARKER WIDTH VALUE	-3 dB	-3 dB
MARKER TRACKING	OFF OFF	OFF OFF



FINAL FUNCTIONAL PERFORMANCE
REJECTION PERFORMANCE
SERIAL NO. P228-010
+15C DATA
OPR: R. HOGGATT DATE DEC 28 1996 annel 2

MARKER PARAMET		
MARKER 1	1.000000 MHz OFF	105.000000 MHz 0 dB
MARKER 2	5.000000 MHz OFF	228.500000 MHz -65.651 dB
MARKER 3	5.000000 MHz OFF	282.783712 MHz -42.27 dB
MARKER 4	5.000000 MHz OFF	.300000 MHz OFF
MKR STIMULUS OFFSET	0.000000 MHz 0 dB	0.000000 MHz 0 dB
REFERENCE MARKER	OFF	MARKER 1
PLACEMENT	CONTINUOUS	CONTINUOUS
MARKER SEARCH	OFF	OFF
TARGET VALUE	-3 dB	-3 dB
MARKER WIDTH VALUE	-3 dB	-3 dB
	OFF	OFF
MARKER TRACKING	OFF	OFF



FINAL FUNCTIONAL PERFORMANCE
REJECTION PERFORMANCE
SERIAL NO. P228-010
+40C DATA
OPR: R. HOGGATT DATE DEC 28 1996

Channel 2

MARKER PARAMET		
MARKER 1	1.000000 MHz OFF	105.000000 MHz 0 dB
MARKER 2	5.000000 MHz OFF	228.500000 MHz -68.026 dB
MARKER 3	5.000000 MHz OFF	282.683742 MHz -42.314 dB
MARKER 4	5.000000 MHz OFF	.300000 MHz OFF
MKR STIMULUS OFFSET	0.000000 MHz 0 dB	0.000000 MHz 0 dB
REFERENCE MARKER	OFF	MARKER 1
PLACEMENT	CONTINUOUS	CONTINUOUS
MARKER SEARCH	OFF	OFF
TARGET VALUE	-3 dB	-3 dB
MARKER WIDTH VALUE	-3 dB	-3 dB
	OFF	OFF
MARKER TRACKING	OFF	OFF

APPENDIX B **ACCEPTANCE TEST REPORT**

BANDPASS FILTER MODEL HL105-190-10SS1 S/N P228-010
AEROJET 1331559-2 REV. F

BANDPASS CHARACTERISTICS MEASUREMENT
PER ATP PARA 4.6
(REF: AE-24687, PARA 4.8.2)

RECORD THE AMBIENT ROOM TEMPERATURE. +23.0 °C (+19°C TO +29.0°C)

{15} ATTACH PASSBAND PERFORMANCE X-Y PLOT ✓(√)

{24} TEST POINT MATRIX

REF	FREQ	UNIT	VALUE
F1	0.5	MHz	-53.2 dB
F2	1.0	MHz	-66.6 dB
F3	5.0	MHz	-17.8 dB
F4	7.5	MHz	-7.47 dB
F5	10.0	MHz	-1.83 dB
F6	20.0	MHz	-0.09 dB
F7	40.0	MHz	-0.16 dB
F8	(*) 60.0	MHz	-0.17 dB
F9	(*) 80.0	MHz	-0.21 dB
F10	105.0	MHz	-0.22 dB

REF	FREQ	UNIT	VALUE
F11	(*) 130.0	MHz	-0.22 dB
F12	(*) 150.0	MHz	-0.26 dB
F13	180.0	MHz	-0.42 dB
F14	190.0	MHz	-0.61 dB
F15	200.0	MHz	-4.02 dB
F16	250.0	MHz	-47.7 dB
F17	300.0	MHz	-43.2 dB
F18	400.0	MHz	-52.3 dB
F19	500.0	MHz	-62.3 dB
F20	1000.0	MHz	-65.1 dB

DA 8

TEST PERFORMED BY: R. Hoggatt DATE 12/27/96

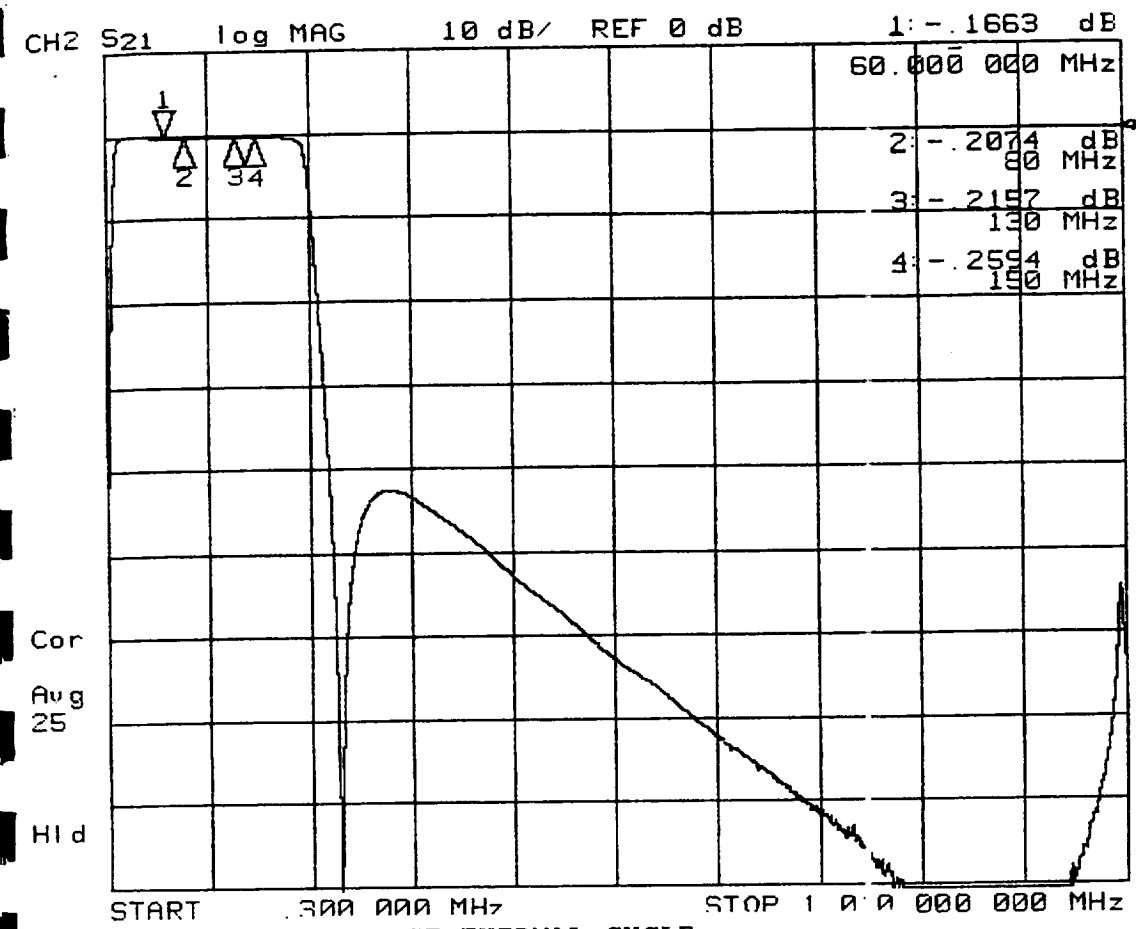
NOTE IF TEST WITNESSED BY AESD_____ GSI ___ Not witnessed this time. DLD

***** END OF BANDPASS CHARACTERISTICS TEST *****

FUNCTIONAL PERFORMANCE TEST
ACCEPTANCE TEST PROCEDURE
63-0005-02 PARA 4.1

BRIEF TEST DESCRIPTION: THE TESTS DESCRIBED IN APPENDIX B PAGE 10 THRU PAGE 13 ARE PERFORMED TO DOCUMENT THE FUNCTIONAL PERFORMANCE OF THE UNIT AT THE CONCLUSION OF ALL ENVIRONMENTAL TESTING. THE TESTS ARE AS FOLLOWS AND IN ANY SEQUENCE:

a.) VSWR PER ATP PARA 4.5.1.
b.) INSERTION LOSS PER ATP PARA 4.5.2
c.) INSERTION LOSS VS TEMPERATURE PER ATP PARA 4.5.6.
d.) 3.0 dB BANDWIDTH PER ATP PARA 4.5.3.
e.) CENTER FREQUENCY (fc) PER ATP PARA 4.5.7 (PART OF 3.0 dB B/W TEST)
f.) PASSBAND RIPPLE PER ATP PARA 4.5.4 (PART OF INSERTION LOSS TEST).
g.) OUT-OF-BAND REJECTION PER ATP PARA 4.5.5.



POST THERMAL CYCLE
PASSBAND CHARACTERISTICS
SERIAL NO. P228-010
AMBIENT
MARKER PARAME OPR: R. HOGGATT DATE DEC 27 '96 Channel 2

MARKER 1	17.750000 MHz OFF	60.000000 MHz -.1663 dB
MARKER 2	157.250000 MHz OFF	80.000000 MHz -.2074 dB
MARKER 3	29.375000 MHz OFF	130.000000 MHz -.2157 dB
MARKER 4	145.625000 MHz OFF	150.000000 MHz -.2594 dB
MKR STIMULUS OFFSET	0.000000 MHz 0 dB	89.425802 MHz -3.2342 dB
REFERENCE MARKER	OFF	OFF
PLACEMENT	CONTINUOUS	CONTINUOUS
MARKER SEARCH	OFF	OFF
TARGET VALUE	-14 dB	-3 dB
MARKER WIDTH VALUE	-3 dB	-3 dB
	OFF	OFF
MARKER TRACKING	OFF	OFF

Channel 8 Bandpass Filter

IF Filter (S/N: 1331559-4, S/N: P230-008)

APPENDIX D **ACCEPTANCE TEST REPORT**

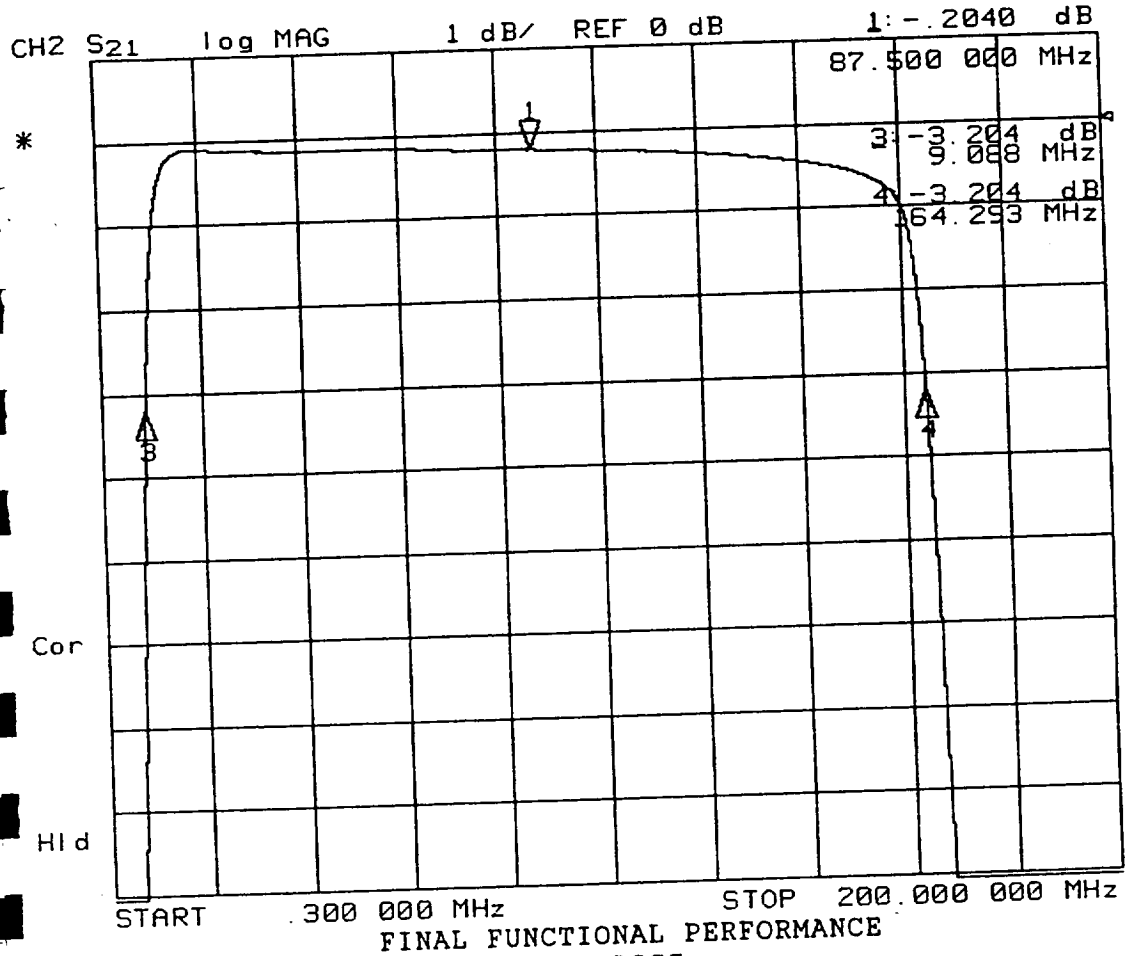
BANDPASS FILTER MODEL HL87.5-155-10SS1 S/N P230-008
AEROJET 1331559-4 REV. E

3.0 dB BANDWIDTH

ACCEPTANCE TEST PROCEDURE 63-0005-02 PARA 4.5.3	-10°C	+15°C	+40°C
{7} UPPER 3.0 dB BANDEDGE	164.29 MHz (163.0-165.0)	164.06 Mhz (163.0-165.0)	163.77 MHz (163.0-165.0)
{8} LOWER 3.0 dB BANDEDGE	9.09 MHz (8.0-10.0)	9.07 Mhz (8.0-10.0)	9.06 MHz (8.0-10.0)
{9} 3.0 dB RELATIVE BANDWIDTH	155.20 MHz (153.0-157.0)	154.99 Mhz (153.0-157.0)	154.71 MHz (153.0-157.0)
{10} ADD {7} AND {8} ÷ 2 =	86.69 MHz (87.5 NOM)	86.57 MHz (87.5 NOM)	86.42 Mhz (87.5 NOM)
{10a} RECORD MEASURED TEMPERATURE	-12.0 °C (-15.0 TO -10.0)	+12.9 °C (12.5 TO 17.5)	+43.5 °C (40.0 TO 45.0)
{6} ATTACH TRANSMISSION LOSS PERFORMANCE X-Y PLOT	✓ (√)	✓ (√)	✓ (√)

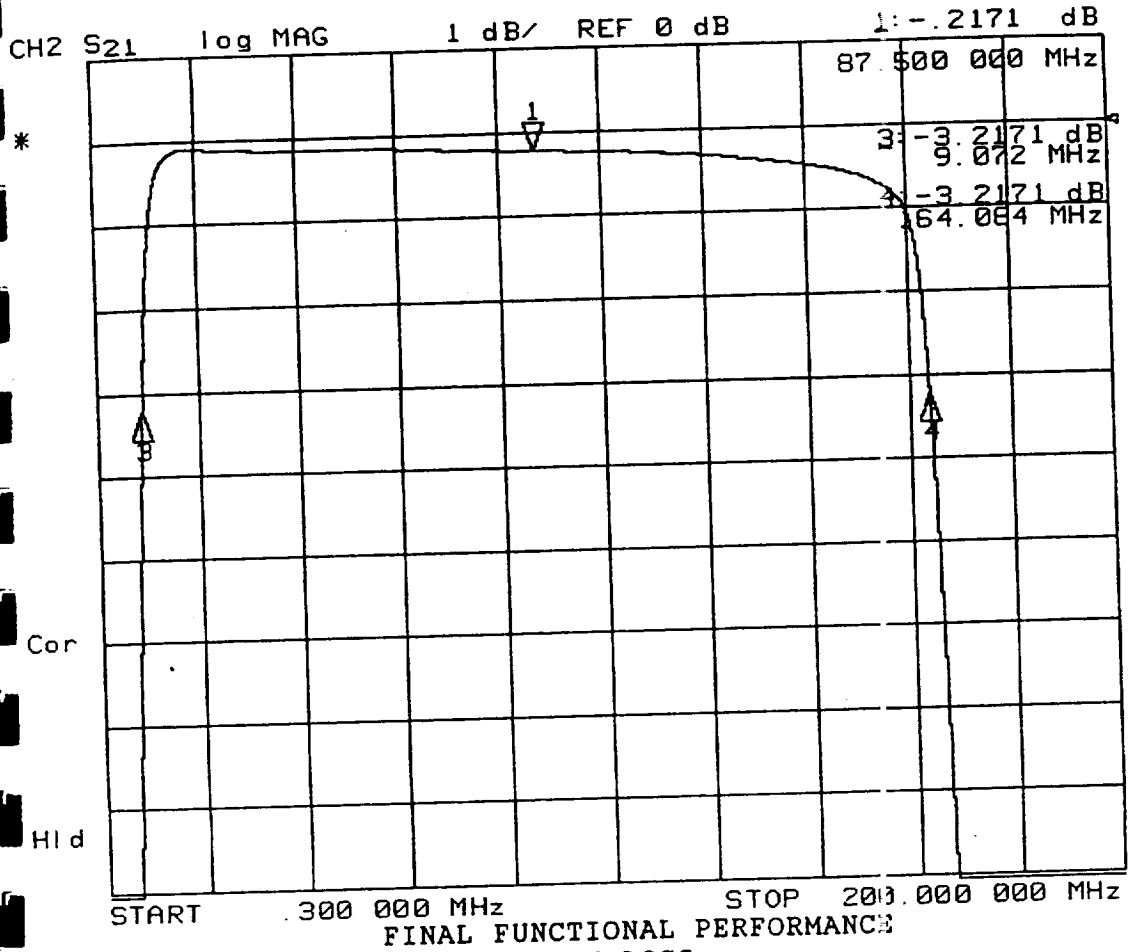
PASSBAND RIPPLE

ACCEPTANCE TEST PROCEDURE 63-0005-02 PARA 4.5.4	-10°C	+15°C	+40°C
{11a} MIN INSERTION LOSS FREQ	19.27 MHz	19.27 Mhz	19.27 MHz
MIN INSERTION LOSS PERFORMANCE	-0.10 dB	-0.10 dB	-0.10 dB
{11b} 75% BW LOWER BANDEDGE FREQ	13.12 MHz	12.96 Mhz	12.82 MHz
75% BW LOWER BANDEDGE I.L. PERF	-0.34 dB	-0.36 dB	-0.38 dB
{11c} 75% BW UPPER BANDEDGE FREQ	129.37 MHz	129.21 Mhz	129.07 MHz
75% BW UPPER BANDEDGE I.L. PERF	-0.34 dB	-0.36 dB	-0.38 dB
{11d} PERFORMANCE DELTA (I.L. @ {11b} - I.L. @ {11a})	0.24 dB	0.26 dB	0.28 dB
{11e} PERFORMANCE DELTA (I.L. @ {11c} - I.L. @ {11a})	0.24 dB	0.26 dB	0.28 dB



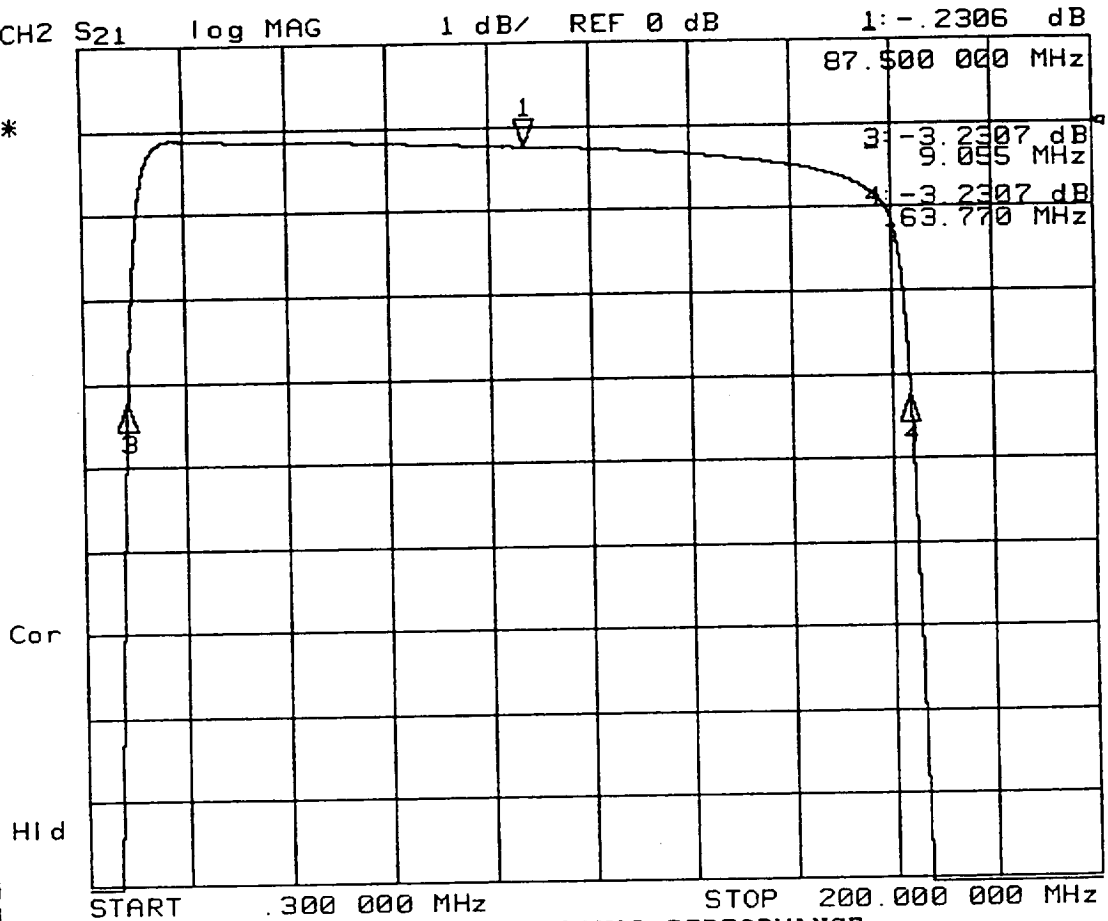
FINAL FUNCTIONAL PERFORMANCE
TRANSMISSION LOSS
SERIAL NO. P230-008
-10C DATA
OPR: R. HOGGATT DATE DEC 20 1996 annel 2

MARKER PARAMET		
MARKER 1	17.750000 MHz OFF	87.500000 MHz -.2040 dB
MARKER 2	157.250000 MHz OFF	86.690839 MHz OFF
MARKER 3	29.375000 MHz OFF	9.088314 MHz -3.204 dB
MARKER 4	145.625000 MHz OFF	164.293365 MHz -3.204 dB
MKR STIMULUS OFFSET	0.000000 MHz 0 dB	89.425802 MHz -3.2342 dB
REFERENCE MARKER	OFF	OFF
PLACEMENT	CONTINUOUS	CONTINUOUS
MARKER SEARCH	OFF	OFF
TARGET VALUE	-14 dB	-3 dB
MARKER WIDTH VALUE	-3 dB	-3 dB
	OFF	OFF
MARKER TRACKING	OFF	OFF



FINAL FUNCTIONAL PERFORMANCE
TRANSMISSION LOSS
SERIAL NO. P230-008
+15C DATA
OPR: R. HOGGATT DATE DEC 20 1996 Channel 2

MARKER PARAMET		
MARKER 1	17.750000 MHz OFF	87.500000 MHz -.2171 dB
MARKER 2	157.250000 MHz OFF	86.568321 MHz OFF
MARKER 3	29.375000 MHz OFF	9.072426 MHz -3.2171 dB
MARKER 4	145.625000 MHz OFF	164.064217 MHz -3.2171 dB
MKR STIMULUS OFFSET	0.000000 MHz 0 dB	89.425802 MHz -3.2342 dB
REFERENCE MARKER	OFF	OFF
PLACEMENT	CONTINUOUS	CONTINUOUS
MARKER SEARCH	OFF	OFF
TARGET VALUE	-14 dB	-3 dB
MARKER WIDTH VALUE	-3 dB	-3 dB
	OFF	OFF
MARKER TRACKING	OFF	OFF



FINAL FUNCTIONAL PERFORMANCE
TRANSMISSION LOSS
SERIAL NO. P230-008
+40C DATA
OPR: R. HOGGATT DATE DEC 20 1996 annel 2

MARKER PARAMET		
MARKER 1	17.750000 MHz OFF	87.500000 MHz -.2306 dB
MARKER 2	157.250000 MHz OFF	86.413049 MHz OFF
MARKER 3	29.375000 MHz OFF	9.055953 MHz -3.2307 dB
MARKER 4	145.625000 MHz OFF	163.770146 MHz -3.2307 dB
MKR STIMULUS OFFSET	0.000000 MHz 0 dB	89.425802 MHz -3.2342 dB
REFERENCE MARKER	OFF	OFF
PLACEMENT	CONTINUOUS	CONTINUOUS
MARKER SEARCH	OFF	OFF
TARGET VALUE	-14 dB	-3 dB
MARKER WIDTH VALUE	-3 dB	-3 dB
	OFF	OFF
MARKER TRACKING	OFF	OFF

APPENDIX D ACCEPTANCE TEST REPORT

BANDPASS FILTER MODEL HL87.5-155-10SS1 S/N P230-008
AEROJET 1331559-4 REV. E

PASSBAND RIPPLE (CON'T)

{11f} RECORD PASS/FAIL (0.5 dB MAX)	(PASS)/FAIL	(PASS)/FAIL	(PASS)/FAIL
{11g} ATTACH PASSBAND RIPPLE PERFORMANCE X-Y PLOT(S)	✓ (√)	✓ (√)	✓ (√)

OUT-OF-BAND REJECTION

ACCEPTANCE TEST PROCEDURE 63-0005-02 PARA 4.5.5 Fc=87.5 MHz. REF {5A} FOR INSERTION LOSS @ Fc	-10°C	+15°C	+40°C
{12} WORST CASE REJECTION FROM 0.300 MHz TO 1.0 MHz	-60.4 dB (40.0 dB MIN)	-60.3 dB (40.0 dB MIN)	-60.3 dB (40.0 dB MIN)
{13a} WORST CASE REJECTION FROM 188.25 MHz TO 1000.0 MHz	-63.0 dB (40.0 dB MIN)	-63.9 dB (40.0 dB MIN)	-64.9 dB (40.0 dB MIN)
{13c} RECORD MEASURED TEMPERATURE	-12.0 °C (-15.0 TO -10.0)	+12.9 °C (12.5 TO 17.5)	+43.5°C (40.0 TO 45.0)
{14} ATTACH REJECTION PERFORMANCE X-Y PLOT(S)	✓ (√) ✓ (√)	✓ (√) ✓ (√)	✓ (√) ✓ (√)

DA 5

TEST PERFORMED BY R. Hoggatt DATE 12/20/96

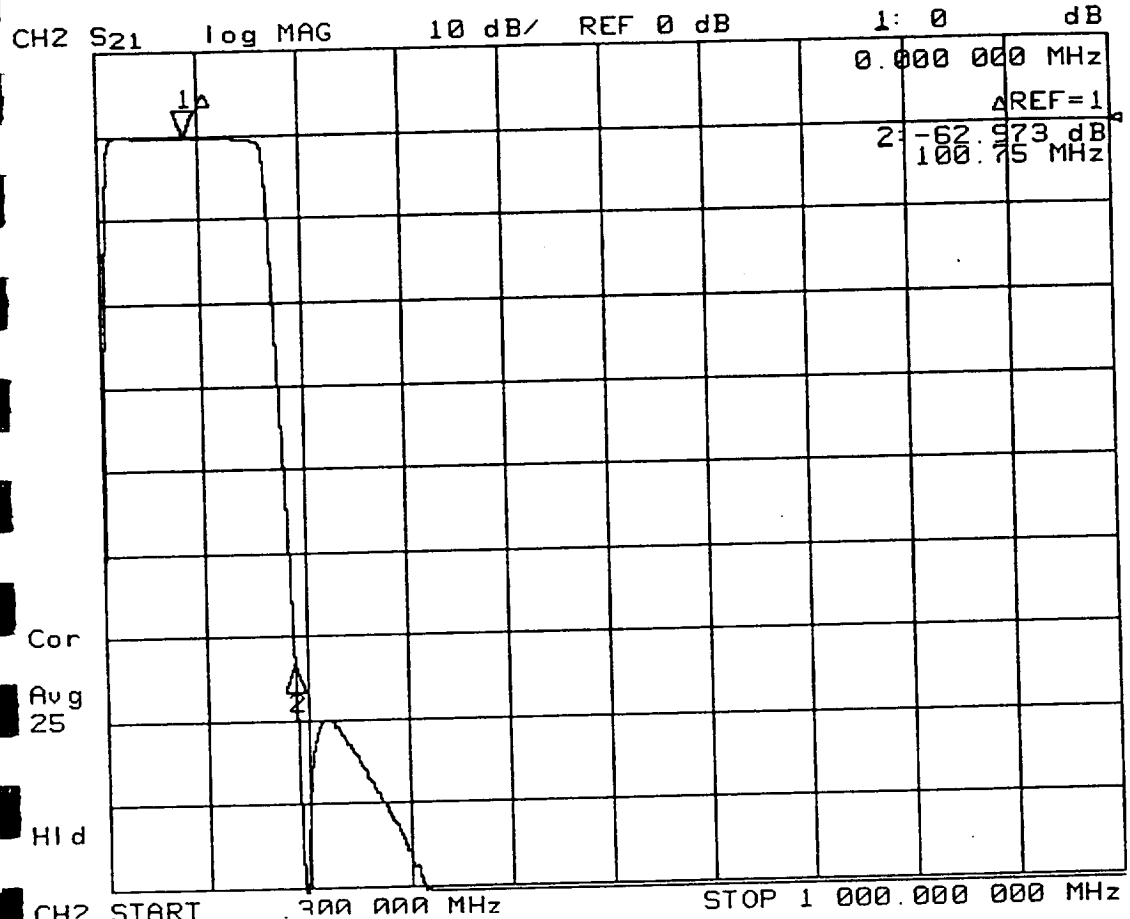
NOTE IF TEST WITNESSED BY AESD: _____ GSI: Not witnessed this time. DLD

***** END OF FUNCTIONAL PERFORMANCE TEST ****

OUTLINE AND MOUNTING DIMENSIONS VERIFICATION

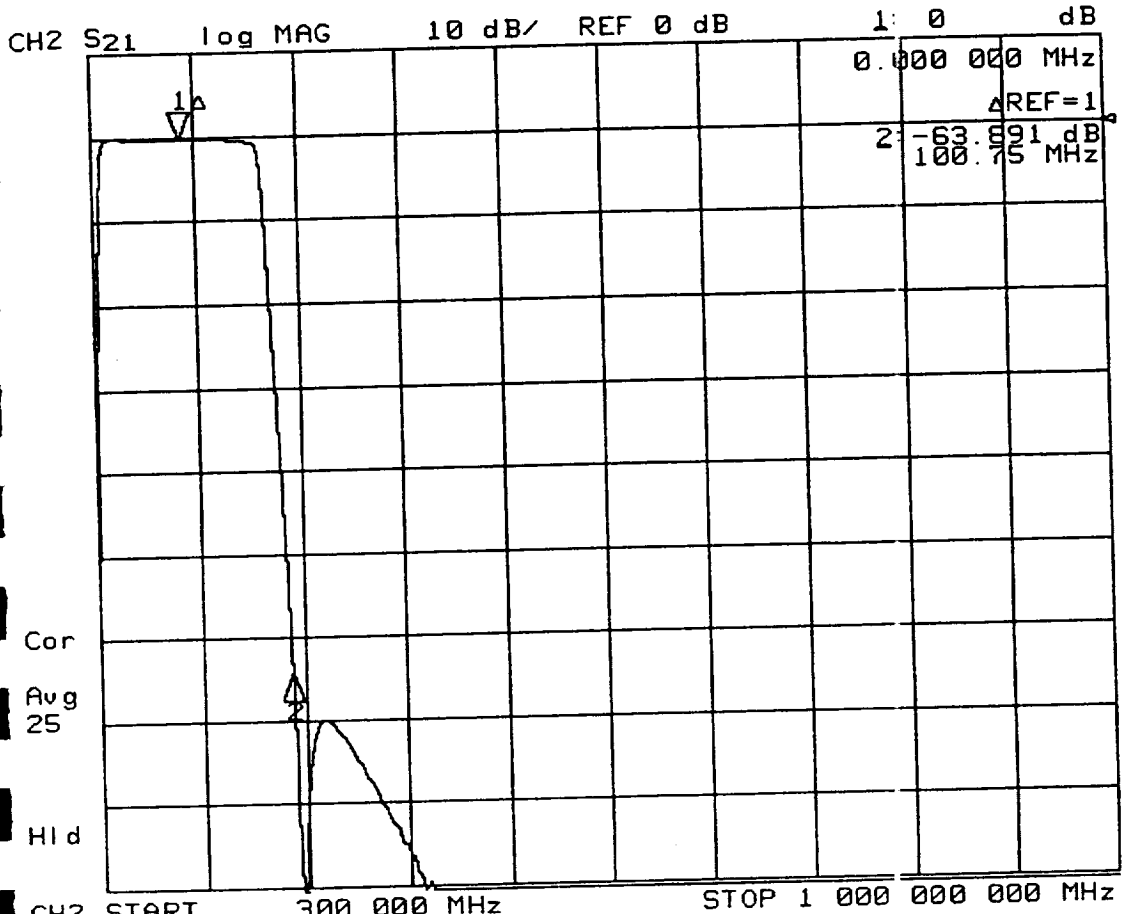
{16} REFERENCE CUSTOMER DRAWING 1331559

DESCRIPTION OF MEASUREMENT	DIMENSION AND TOLERANCE	ACTUAL MEASUREMENT
OVER ALL LENGTH	3.50 ± .03	3.502
MOUNTING HOLE CENTER	0.125 ± .010	0.127
BETWEEN UPPER MOUNTING HOLES	3.250	3.251
BETWEEN LOWER MOUNTING HOLES	3.250	3.252



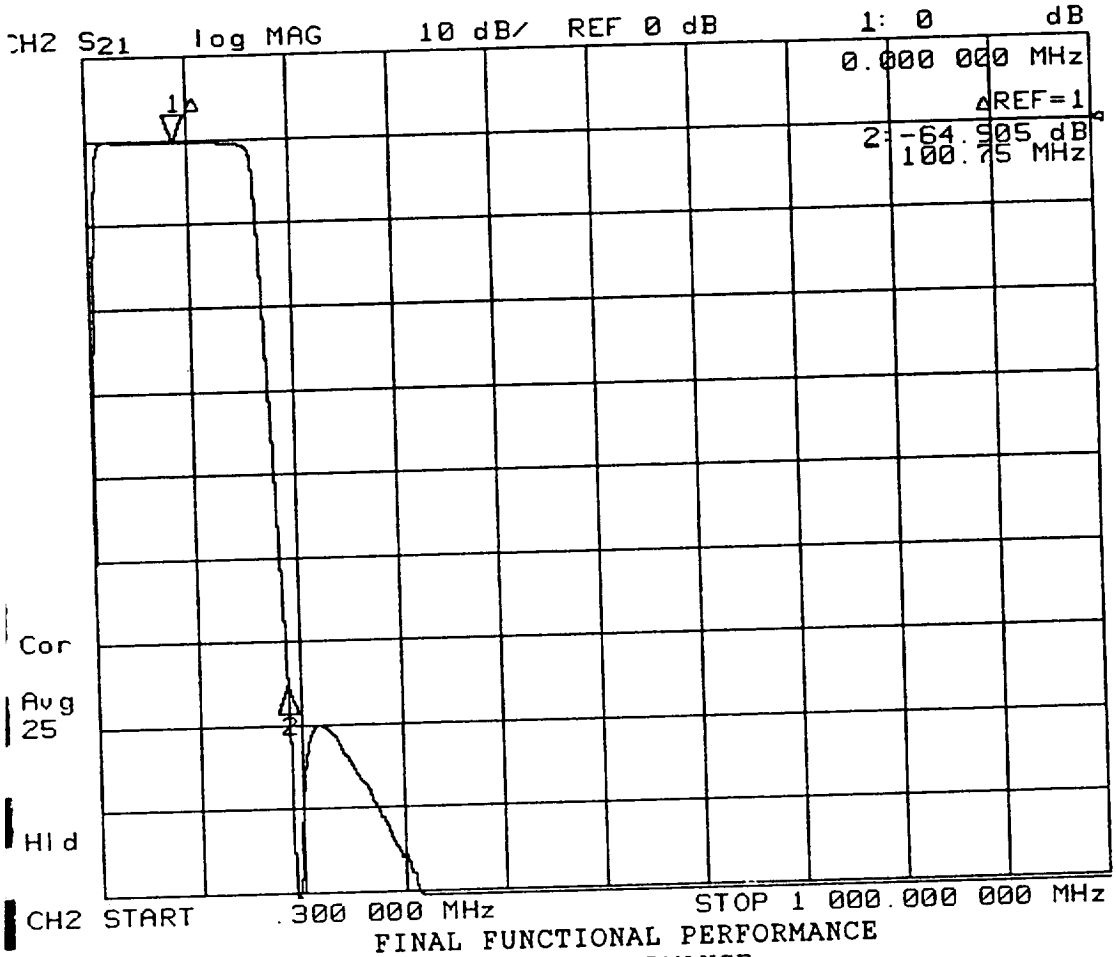
FINAL FUNCTIONAL PERFORMANCE
REJECTION PERFORMANCE
SERIAL NO. P230-008
-10C DATA
OPR: R. HOGGATT DATE DEC 20 1996 annel 2

MARKER PARAME		
MARKER 1	1.000000 MHz OFF	87.500000 MHz 0 dB
MARKER 2	5.000000 MHz OFF	188.250000 MHz -62.973 dB
MARKER 3	5.000000 MHz OFF	188.250000 MHz OFF
MARKER 4	5.000000 MHz OFF	1000.000000 MHz OFF
MKR STIMULUS OFFSET	0.000000 MHz 0 dB	0.000000 MHz 0 dB
REFERENCE MARKER	OFF	MARKER 1
PLACEMENT	CONTINUOUS	CONTINUOUS
MARKER SEARCH	OFF	OFF
TARGET VALUE	-3 dB	-3 dB
MARKER WIDTH VALUE	-3 dB	-3 dB
	OFF	OFF
MARKER TRACKING	OFF	OFF



FINAL FUNCTIONAL PERFORMANCE
REJECTION PERFORMANCE
SERIAL NO. P230-008
+15C DATA
OPR: R. HOGGATT DATE DEC 20 1996 annel 2

MARKER PARAMET		
MARKER 1	1.000000 MHz OFF	87.500000 MHz 0 dB
MARKER 2	5.000000 MHz OFF	188.250000 MHz -63.891 dB
MARKER 3	5.000000 MHz OFF	188.250000 MHz OFF
MARKER 4	5.000000 MHz OFF	1000.000000 MHz OFF
MKR STIMULUS OFFSET	0.000000 MHz 0 dB	0.000000 MHz 0 dB
REFERENCE MARKER	OFF	MARKER 1
PLACEMENT	CONTINUOUS	CONTINUOUS
MARKER SEARCH	OFF	OFF
TARGET VALUE	-3 dB	-3 dB
MARKER WIDTH VALUE	-3 dB	-3 dB
	OFF	OFF
MARKER TRACKING	OFF	OFF



FINAL FUNCTIONAL PERFORMANCE
REJECTION PERFORMANCE
SERIAL NO. P230-008
+40C DATA
OPR: R. HOGGATT DATE DEC 20 1996 annel 2

MARKER PARAMET		
MARKER 1	1.000000 MHz OFF	87.500000 MHz 0 dB
MARKER 2	5.000000 MHz OFF	188.250000 MHz -64.905 dB
MARKER 3	5.000000 MHz OFF	188.250000 MHz OFF
MARKER 4	5.000000 MHz OFF	1000.000000 MHz OFF
MKR STIMULUS OFFSET	0.000000 MHz 0 dB	0.000000 MHz 0 dB
REFERENCE MARKER	OFF	MARKER 1
PLACEMENT	CONTINUOUS	CONTINUOUS
MARKER SEARCH	OFF	OFF
TARGET VALUE	-3 dB	-3 dB
MARKER WIDTH VALUE	-3 dB	-3 dB
MARKER TRACKING	OFF	OFF
	OFF	OFF

APPENDIX D **ACCEPTANCE TEST REPORT**

BANDPASS FILTER MODEL HL87.5-155-10SS1 S/N P230-008
AEROJET 1331559-4 REV. E

BANDPASS CHARACTERISTICS MEASUREMENT
PER ATP PARA 4.6
(REF: AE-24687, PARA 4.8.2)

RECORD THE AMBIENT ROOM TEMPERATURE. +23.1 °C (+19°C TO +29.0°C)

{15} ATTACH PASSBAND PERFORMANCE X-Y PLOT ✓ (√)

{24} TEST POINT MATRIX

REF	FREQ	UNIT	VALUE	REF	FREQ	UNIT	VALUE
F1	0.5	MHz	-83.6 dB	F11	(*) 100.0	MHz	-0.24 dB
F2	1.0	MHz	-67.3 dB	F12	(*) 125.0	MHz	-0.32 dB
F3	5.0	MHz	-18.4 dB	F13	150.0	MHz	-0.58 dB
F4	7.5	MHz	-7.47 dB	F14	160.0	MHz	-1.06 dB
F5	10.0	MHz	-1.69 dB	F15	165.0	MHz	-4.56 dB
F6	15.0	MHz	-0.20 dB	F16	170.0	MHz	-15.9 dB
F7	25.0	MHz	-0.11 dB	F17	200.0	MHz	-82.2 dB
F8	(*) 50.0	MHz	-0.15 dB	F18	300.0	MHz	-86.1 dB
F9	(*) 75.0	MHz	-0.21 dB	F19	500.0	MHz	-104.6 dB
F10	87.5	MHz	-0.26 dB	F20	1000.0	MHz	-110.7 dB

TEST PERFORMED BY: T. HOGGATT (DA 5) DATE 12/20/96

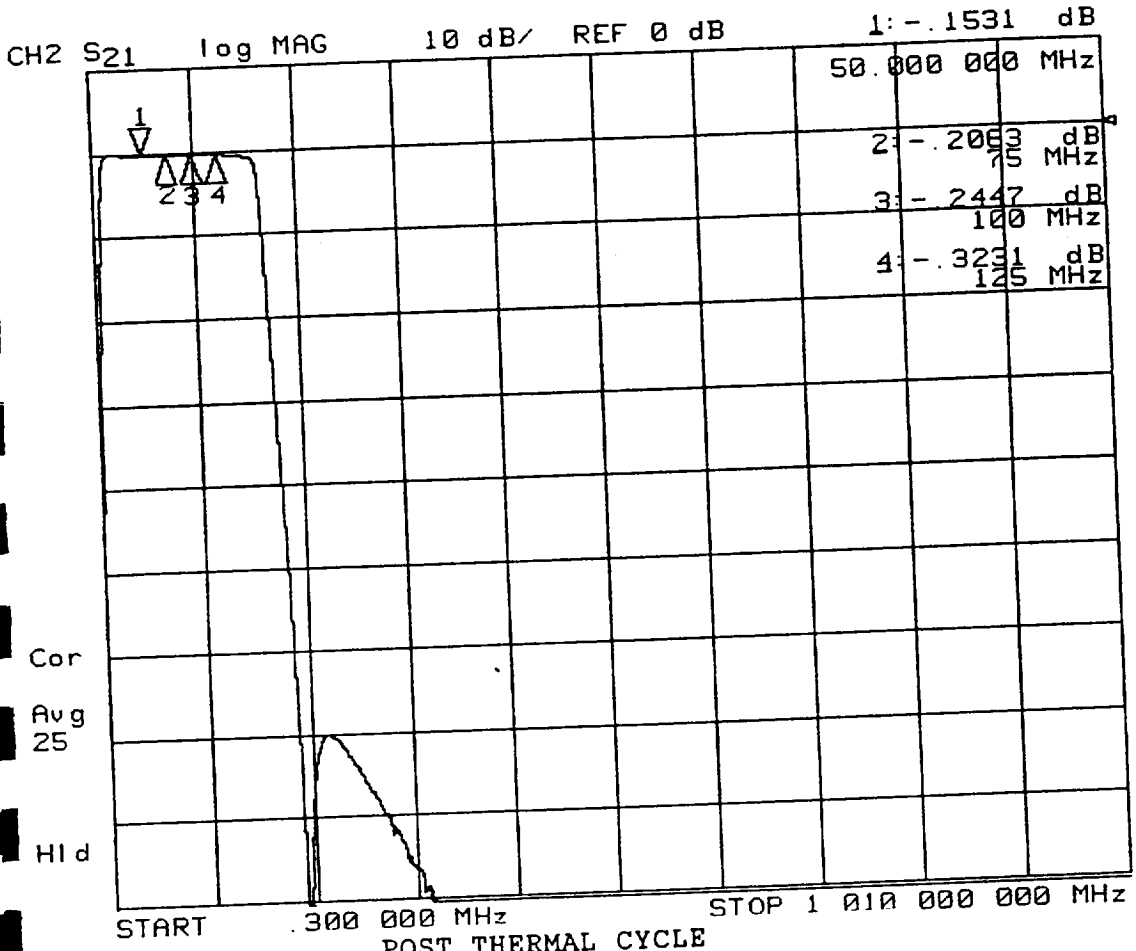
NOTE IF TEST WITNESSED BY AESD _____ GSI. Not witnessed this time. DLD

***** END OF BANDPASS CHARACTERISTICS TEST *****

FUNCTIONAL PERFORMANCE TEST
ACCEPTANCE TEST PROCEDURE
63-0005-02 PARA 4.1

BRIEF TEST DESCRIPTION: THE TESTS DESCRIBED IN APPENDIX D PAGE 10 THRU PAGE 13 ARE PERFORMED TO DOCUMENT THE FUNCTIONAL PERFORMANCE OF THE UNIT AT THE CONCLUSION OF ALL ENVIRONMENTAL TESTING. THE TESTS ARE AS FOLLOWS AND IN ANY SEQUENCE:

a.) CENTER FREQUENCY (fc) PER ATP PARA 4.5.7 (PART OF 3.0 dB B/W TEST)
b.) 3.0 dB BANDWIDTH PER ATP PARA 4.5.3.
c.) OUT-OF-BAND REJECTION PER ATP PARA 4.5.5.
d) INSERTION LOSS PER ATP PARA 4.5.2
e) INSERTION LOSS VS TEMPERATURE PER ATP PARA 4.5.6.
f.) PASSBAND RIPPLE PER ATP PARA 4.5.4 (PART OF INSERTION LOSS TEST).
g.) VSWR PER ATP PARA 4.5.1.



POST THERMAL CYCLE
PASSBAND CHARACTERISTICS
SERIAL NO. P230-008
AMBIENT
OPR: R. HOGGATT DATE DEC 20 1996 annel 2

MARKER PARAMET		
MARKER 1	17.750000 MHz OFF	50.000000 MHz -.1531 dB
MARKER 2	157.250000 MHz OFF	75.000000 MHz -.2063 dB
MARKER 3	29.375000 MHz OFF	100.000000 MHz -.2447 dB
MARKER 4	145.625000 MHz OFF	125.000000 MHz -.3231 dB
MKR STIMULUS OFFSET	0.000000 MHz 0 dB	89.425802 MHz -3.2342 dB
REFERENCE MARKER	OFF	OFF
PLACEMENT	CONTINUOUS	CONTINUOUS
MARKER SEARCH	OFF	OFF
TARGET VALUE	-14 dB	-3 dB
MARKER WIDTH VALUE	-3 dB	-3 dB
	OFF	OFF
MARKER TRACKING	OFF	OFF

Channel 9 Bandpass Filter

IF Filter (S/N: 1331559-4, S/N: P230-009)

APPENDIX D **ACCEPTANCE TEST REPORT**

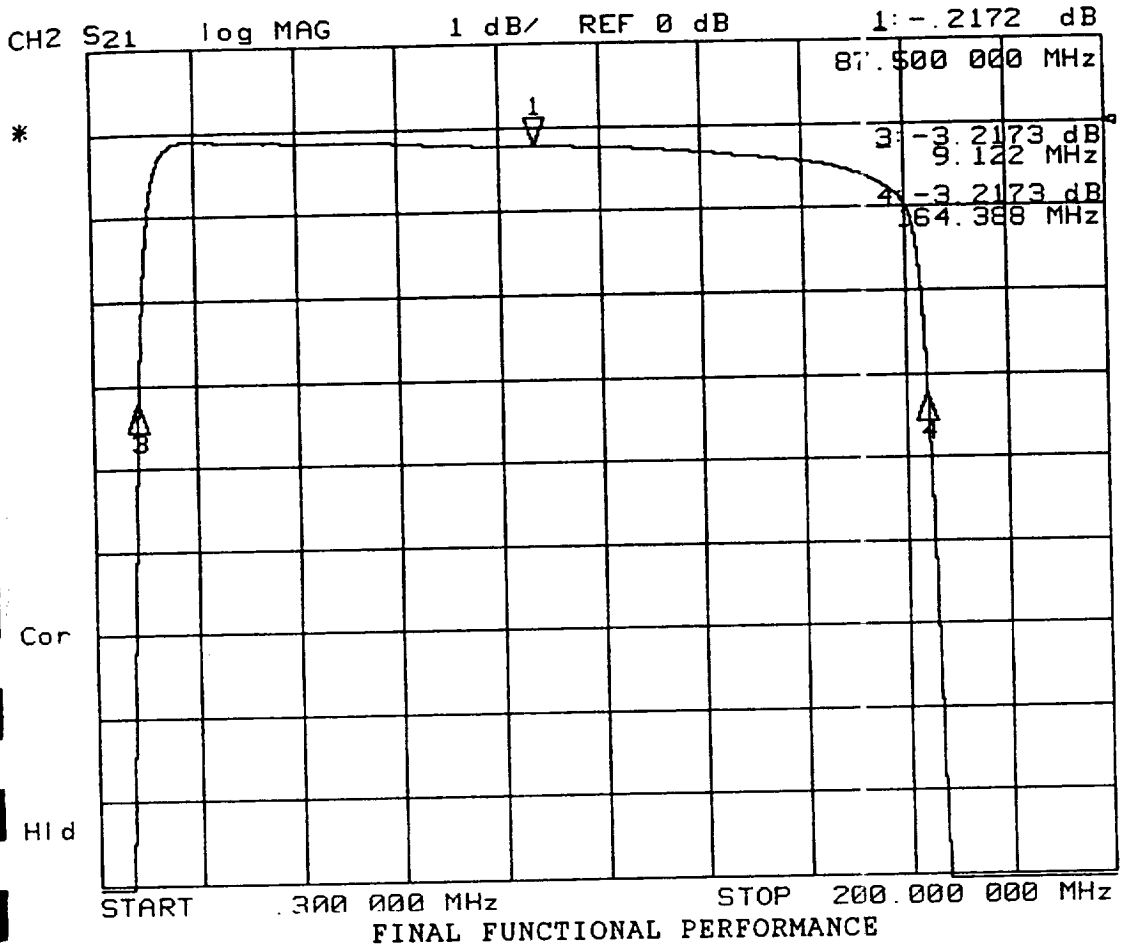
BANDPASS FILTER MODEL HL87.5-155-10SS1 S/N P230-009
AEROJET 1331559-4 REV. E

3.0 dB BANDWIDTH

ACCEPTANCE TEST PROCEDURE 63-0005-02 PARA 4.5.3	-10°C	+15°C	+40°C
{7} UPPER 3.0 dB BANDEDGE	164.39 MHz (163.0-165.0)	164.15 Mhz (163.0-165.0)	163.85 MHz (163.0-165.0)
{8} LOWER 3.0 dB BANDEDGE	9.12 MHz (8.0-10.0)	9.11 Mhz (8.0-10.0)	9.09 MHz (8.0-10.0)
{9} 3.0 dB RELATIVE BANDWIDTH	155.27 MHz (153.0-157.0)	155.04 Mhz (153.0-157.0)	154.76 MHz (153.0-157.0)
{10} ADD {7} AND {8} ÷ 2 =	86.76 MHz (87.5 NOM)	86.63 MHz (87.5 NOM)	86.47 Mhz (87.5 NOM)
{10a} RECORD MEASURED TEMPERATURE	-12.2 °C (-15.0 TO -10.0)	+12.8 °C (12.5 TO 17.5)	+43.0 °C (40.0 TO 45.0)
{6} ATTACH TRANSMISSION LOSS PERFORMANCE X-Y PLOT	✓ (√)	✓ (√)	✓ (√)

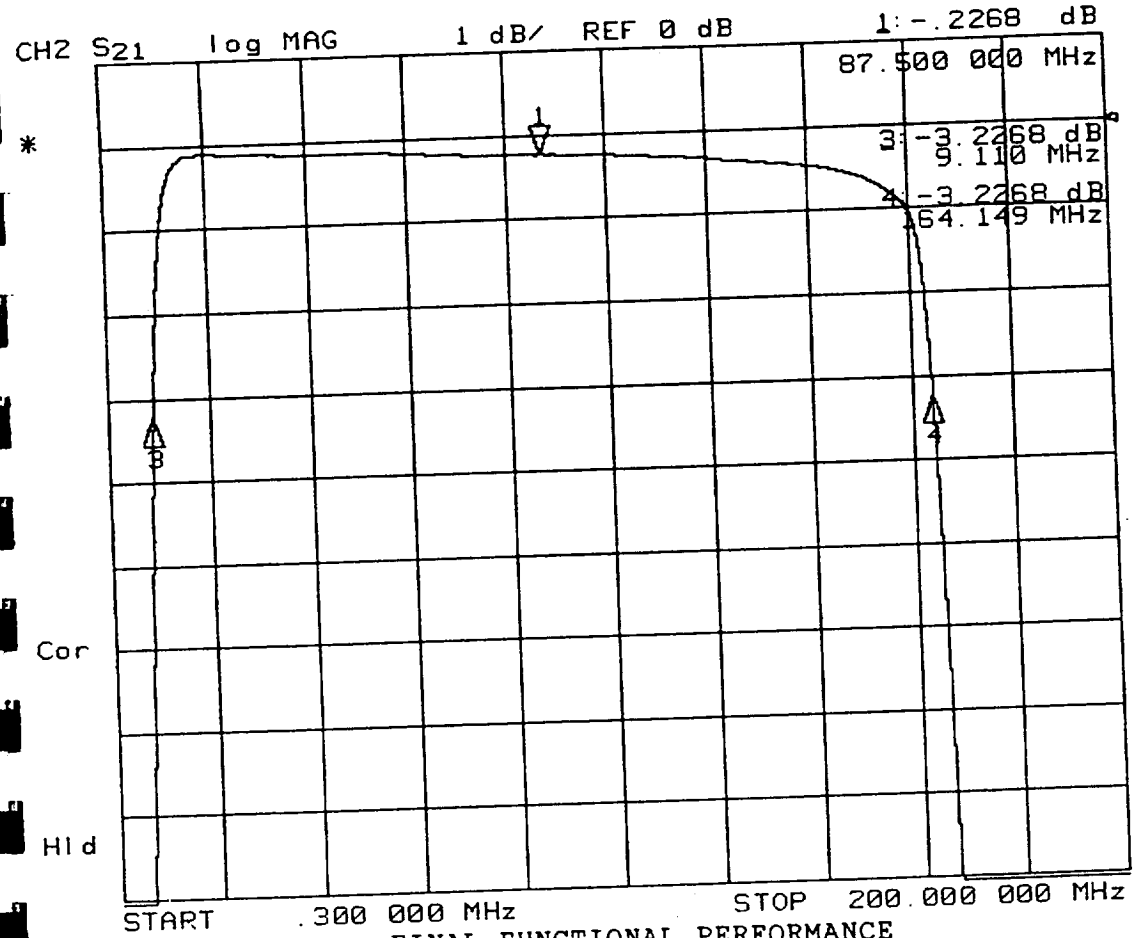
PASSBAND RIPPLE

ACCEPTANCE TEST PROCEDURE 63-0005-02 PARA 4.5.4	-10°C	+15°C	+40°C
{11a} MIN INSERTION LOSS FREQ	19.27 MHz	19.27 Mhz	19.27 MHz
MIN INSERTION LOSS PERFORMANCE	-0.10 dB	-0.10 dB	-0.11 dB
{11b} 75% BW LOWER BANDEDGE FREQ	13.15 MHz	13.06 Mhz	12.90 MHz
75% BW LOWER BANDEDGE I.L. PERF	-0.36 dB	-0.38 dB	-0.41 dB
{11c} 75% BW UPPER BANDEDGE FREQ	129.40 MHz	129.31 Mhz	129.15 MHz
75% BW UPPER BANDEDGE I.L. PERF	-0.36 dB	-0.38 dB	-0.41 dB
{11d} PERFORMANCE DELTA (I.L. @ {11b} - I.L. @ {11a})	0.26 dB	0.28 dB	0.30 dB
{11e} PERFORMANCE DELTA (I.L. @ {11c} - I.L. @ {11a})	0.26 dB	0.28 dB	-0.30 dB



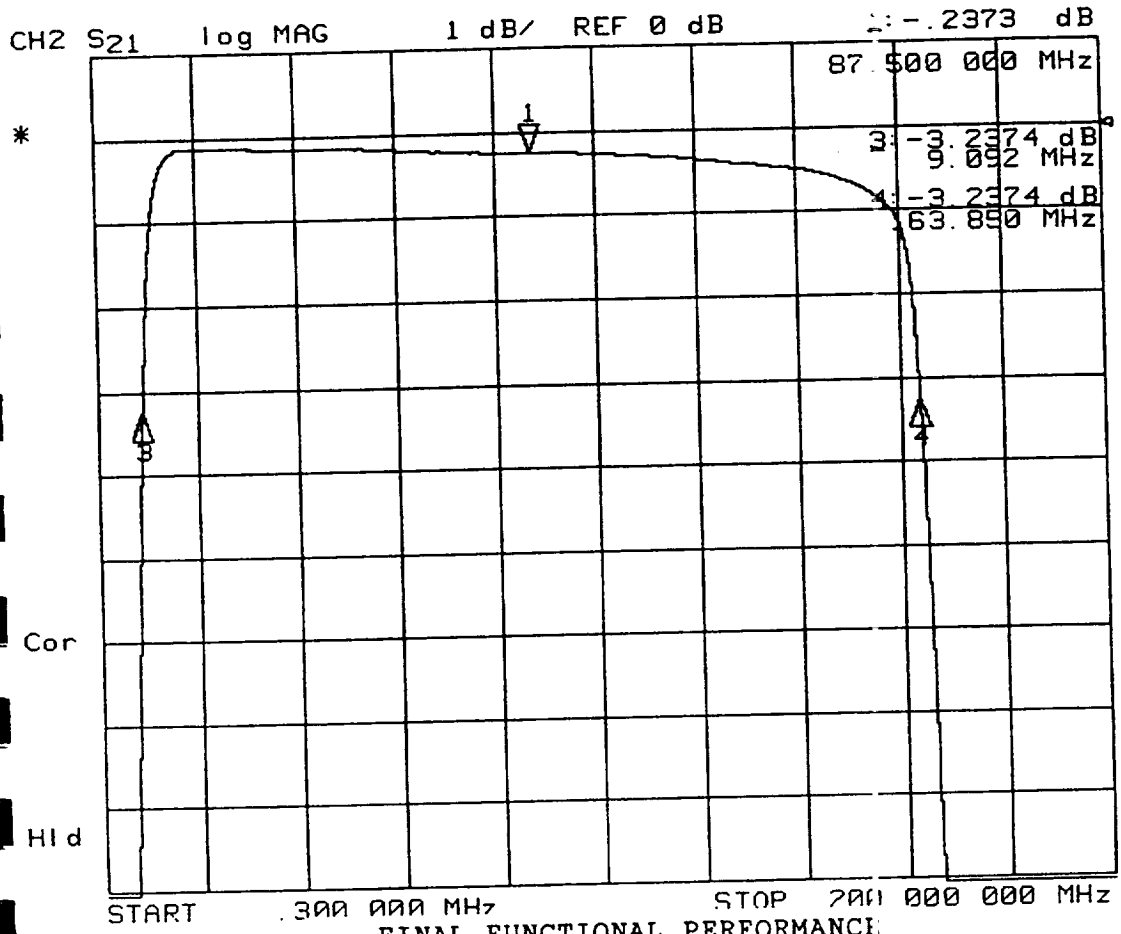
FINAL FUNCTIONAL PERFORMANCE
TRANSMISSION LOSS
SERIAL NO. P230-009
-10C DATA
OPR: R. HOGGATT DATE DEC 20 996 annel 2

MARKER PARAMET		
MARKER 1	17.750000 MHz OFF	87.500000 MHz -.2172 dB
MARKER 2	157.250000 MHz OFF	86.755645 MHz OFF
MARKER 3	29.375000 MHz OFF	9.122526 MHz -3.2173 dB
MARKER 4	145.625000 MHz OFF	164.388765 MHz -3.2173 dB
MKR STIMULUS OFFSET	0.000000 MHz 0 dB	89.425802 MHz -3.2342 dB
REFERENCE MARKER	OFF	OFF
PLACEMENT	CONTINUOUS	CONTINUOUS
MARKER SEARCH	OFF	OFF
TARGET VALUE	-14 dB	-3 dB
MARKER WIDTH VALUE	-3 dB	-3 dB
	OFF	OFF
MARKER TRACKING	OFF	OFF



FINAL FUNCTIONAL PERFORMANCE
TRANSMISSION LOSS
SERIAL NO. P230-009
+15C DATA
OPR: R. HOGGATT DATE DEC 20 1996 annel 2

MARKER PARAMET		
MARKER 1	17.750000 MHz OFF	87.500000 MHz -.2268 dB
MARKER 2	157.250000 MHz OFF	86.629755 MHz OFF
MARKER 3	29.375000 MHz OFF	9.110127 MHz -3.2268 dB
MARKER 4	145.625000 MHz OFF	164.149383 MHz -3.2268 dB
MKR STIMULUS OFFSET	0.000000 MHz 0 dB	89.425802 MHz -3.2342 dB
REFERENCE MARKER	OFF	OFF
PLACEMENT	CONTINUOUS	CONTINUOUS
MARKER SEARCH	OFF	OFF
TARGET VALUE	-14 dB	-3 dB
MARKER WIDTH VALUE	-3 dB	-3 dB
	OFF	OFF
MARKER TRACKING	OFF	OFF



FINAL FUNCTIONAL PERFORMANCE
TRANSMISSION LOSS
SERIAL NO. P230-009
+40C DATA
OPR: R. HOGGATT DATE DEC 20 1996 Channel 2

MARKER PARAMET		
MARKER 1	7.750000 MHz OFF	87.500000 MHz -.2373 dB
MARKER 2	157.250000 MHz OFF	86.471522 MHz OFF
MARKER 3	29.375000 MHz OFF	9.092373 MHz -3.2374 dB
MARKER 4	145.625000 MHz OFF	163.850672 MHz -3.2374 dB
MKR STIMULUS OFFSET	0.000000 MHz 0 dB	89.425802 MHz -3.2342 dB
REFERENCE MARKER	OFF	OFF
PLACEMENT	CONTINUOUS	CONTINUOUS
MARKER SEARCH	OFF	OFF
TARGET VALUE	-14 dB	-3 dB
MARKER WIDTH VALUE	-3 dB	-3 dB
	OFF	OFF
MARKER TRACKING	OFF	OFF

APPENDIX D ACCEPTANCE TEST REPORT

BANDPASS FILTER MODEL HL87.5-155-10SS1 S/N P230-009
AEROJET 1331559-4 REV. E

PASSBAND RIPPLE (CON'T)

{11f} RECORD PASS/FAIL (0.5 dB MAX)	(PASS)/FAIL	(PASS)/FAIL	(PASS)/FAIL
{11g} ATTACH PASSBAND RIPPLE PERFORMANCE X-Y PLOT(S)	✓ (√)	✓ (√)	✓ (√)

OUT-OF-BAND REJECTION

ACCEPTANCE TEST PROCEDURE 63-0005-02 PARA 4.5.5 Fc=87.5 MHz. REF {5A} FOR INSERTION LOSS @ Fc	-10°C	+15°C	+40°C
{12} WORST CASE REJECTION FROM 0.300 MHz TO 1.0 MHz	-60.4 dB (40.0 dB MIN)	-60.3 dB (40.0 dB MIN)	-60.3 dB (40.0 dB MIN)
{13a} WORST CASE REJECTION FROM 188.25 MHz TO 1000.0 MHz	-63.9 dB (40.0 dB MIN)	-64.9 dB (40.0 dB MIN)	-65.9 dB (40.0 dB MIN)
{13c} RECORD MEASURED TEMPERATURE	-12.4 °C (-15.0 TO -10.0)	+12.8 °C (12.5 TO 17.5)	+43.1 °C (40.0 TO 45.0)
{14} ATTACH REJECTION PERFORMANCE X-Y PLOT(S)	✓ (√) ✓ (√)	✓ (√) ✓ (√)	✓ (√) ✓ (√)

DA 5

TEST PERFORMED BY R. Hoggatt DATE 12/20/96

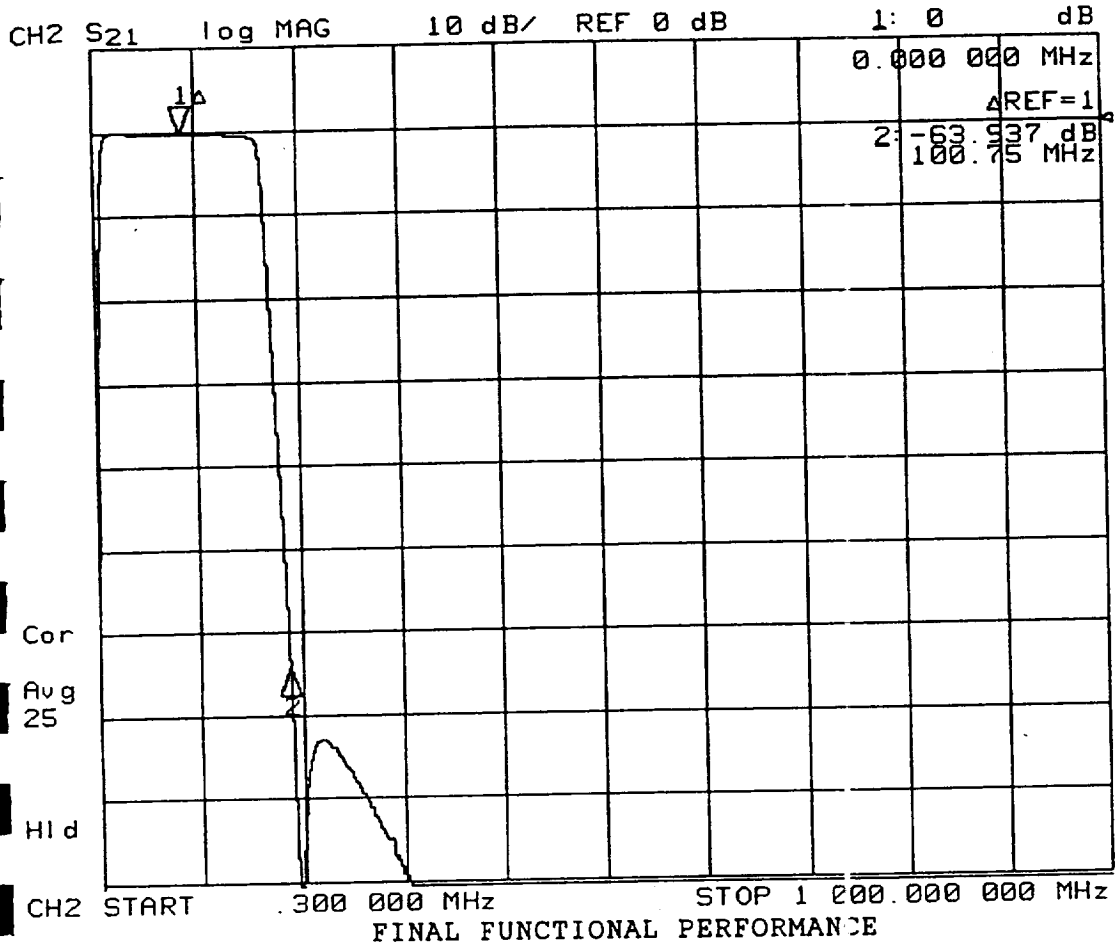
NOTE IF TEST WITNESSED BY AESD: Not witnessed this time. DLD

***** END OF FUNCTIONAL PERFORMANCE TEST ****

OUTLINE AND MOUNTING DIMENSIONS VERIFICATION

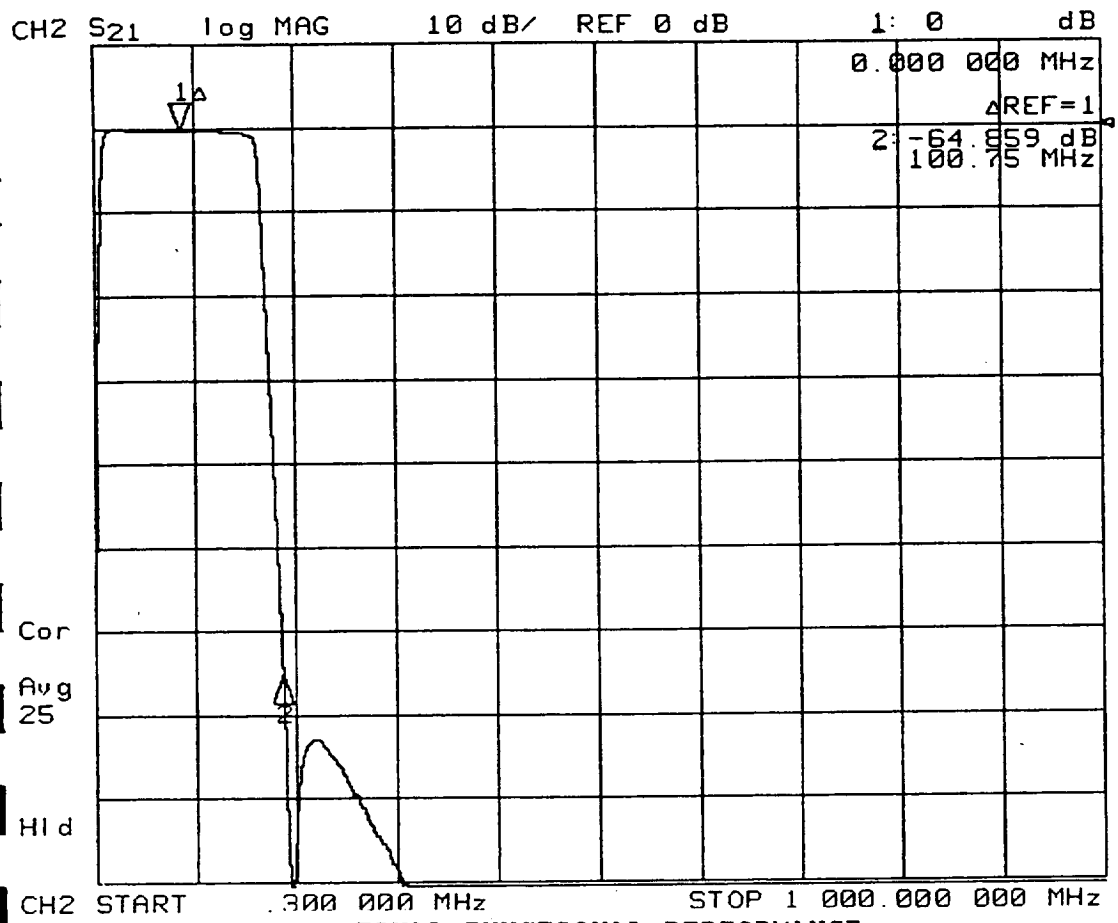
{16} REFERENCE CUSTOMER DRAWING 1331559

DESCRIPTION OF MEASUREMENT	DIMENSION AND TOLERANCE	ACTUAL MEASUREMENT
OVER ALL LENGTH	3.50 ± .03	3.499
MOUNTING HOLE CENTER	0.125 ± .010	0.125
BETWEEN UPPER MOUNTING HOLES	3.250	3.250
BETWEEN LOWER MOUNTING HOLES	3.250	3.250



FINAL FUNCTIONAL PERFORMANCE
REJECTION PERFORMANCE
SERIAL NO. P230-009
-10C DATA
OPR: R. HOGGATT DATE DEC 2 (1996 annel 2

MARKER PARAMET		
MARKER 1	1.000000 MHz OFF	87.500000 MHz 0 dB
MARKER 2	5.000000 MHz OFF	188.250000 MHz -63.937 dB
MARKER 3	5.000000 MHz OFF	188.250000 MHz OFF
MARKER 4	5.000000 MHz OFF	1000.000000 MHz OFF
MKR STIMULUS OFFSET	0.000000 MHz 0 dB	0.000000 MHz 0 dB
REFERENCE MARKER	OFF	MARKER 1
PLACEMENT	CONTINUOUS	CONTINUOUS
MARKER SEARCH	OFF	OFF
TARGET VALUE	-3 dB	-3 dB
MARKER WIDTH VALUE	-3 dB	-3 dB
	OFF	OFF
MARKER TRACKING	OFF	OFF

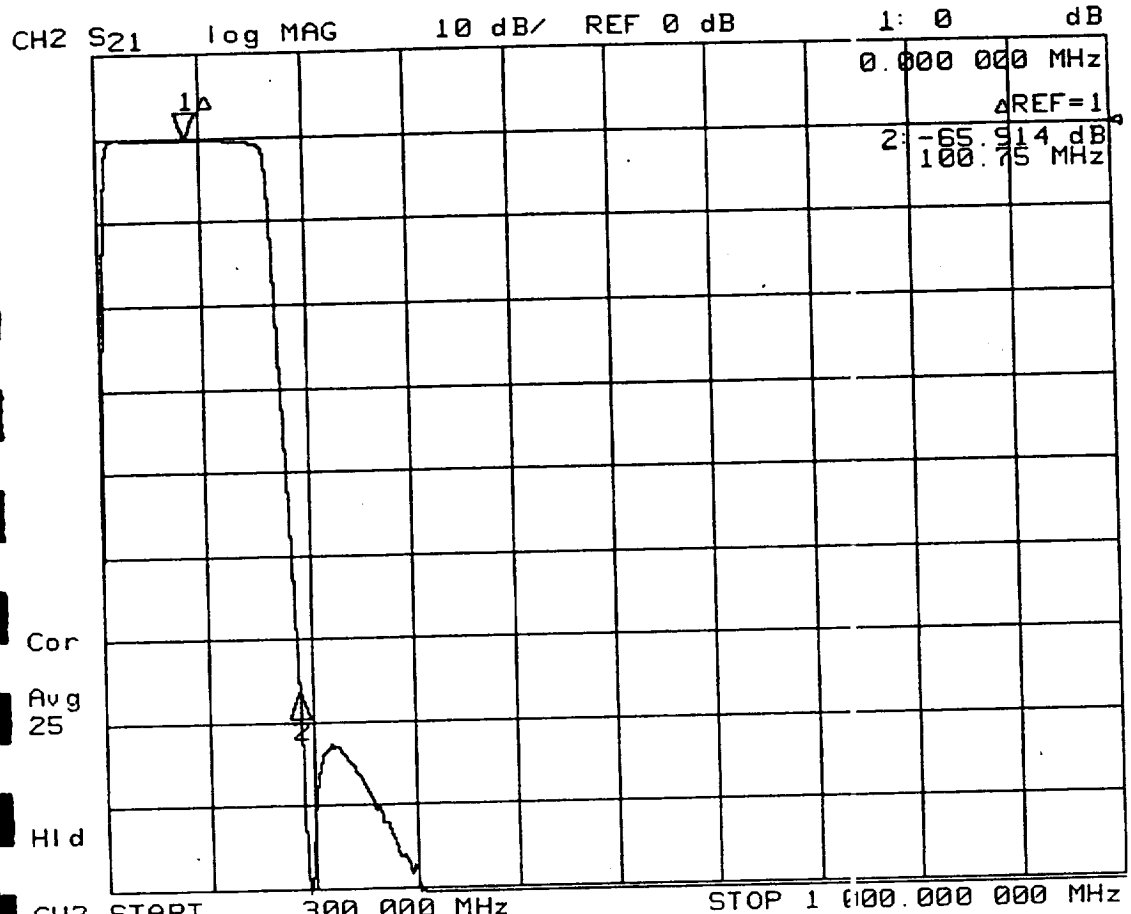


FINAL FUNCTIONAL PERFORMANCE
REJECTION PERFORMANCE
SERIAL NO. P230-009
+15C DATA
OPR: R. HOGGATT DATE DEC 20 1996

annel 2

MARKER 1	1.000000 MHz OFF	87.500000 MHz 0 dB
MARKER 2	5.000000 MHz OFF	188.250000 MHz -64.859 dB
MARKER 3	5.000000 MHz OFF	188.250000 MHz OFF
MARKER 4	5.000000 MHz OFF	1000.000000 MHz OFF
MKR STIMULUS OFFSET	0.000000 MHz 0 dB	0.000000 MHz 0 dB

REFERENCE MARKER	OFF	MARKER 1
PLACEMENT	CONTINUOUS	CONTINUOUS
MARKER SEARCH	OFF	OFF
TARGET VALUE	-3 dB	-3 dB
MARKER WIDTH VALUE	-3 dB	-3 dB
	OFF	OFF
MARKER TRACKING	OFF	OFF



FINAL FUNCTIONAL PERFORMANCE
REJECTION PERFORMANCE
SERIAL NO. P230-009
+40C DATA
OPR: R. HOGGATT DATE DEC 20 1996

annel 2

MARKER PARAMET		
MARKER 1	1.000000 MHz OFF	87.500000 MHz 0 dB
MARKER 2	5.000000 MHz OFF	188.250000 MHz -65.914 dB
MARKER 3	5.000000 MHz OFF	188.250000 MHz OFF
MARKER 4	5.000000 MHz OFF	1000.000000 MHz OFF
MKR STIMULUS OFFSET	0.000000 MHz 0 dB	0.000000 MHz 0 dB
REFERENCE MARKER	OFF	MARKER 1
PLACEMENT	CONTINUOUS	CONTINUOUS
MARKER SEARCH	OFF	OFF
TARGET VALUE	-3 dB	-3 dB
MARKER WIDTH VALUE	-3 dB	-3 dB
	OFF	OFF
MARKER TRACKING	OFF	OFF

APPENDIX D ACCEPTANCE TEST REPORT

BANDPASS FILTER MODEL HL87.5-155-10SS1 S/N P230-009
AEROJET 1331559-4 REV. E

BANDPASS CHARACTERISTICS MEASUREMENT
PER ATP PARA 4.6
(REF: AE-24687, PARA 4.8.2)

RECORD THE AMBIENT ROOM TEMPERATURE: +23.2 °C (+19°C TO +29.0°C)

{15} ATTACH PASSBAND PERFORMANCE X-Y PLOT ✓ (√)

{24} TEST POINT MATRIX

REF	FREQ	UNIT	VALUE	REF	FREQ	UNIT	VALUE
F1	0.5	MHz	-83.7 dB	F11	(*) 100.0	MHz	-0.25 dB
F2	1.0	MHz	-67.4 dB	F12	(*) 125.0	MHz	-0.36 dB
F3	5.0	MHz	-18.5 dB	F13	150.0	MHz	-0.60 dB
F4	7.5	MHz	-7.53 dB	F14	160.0	MHz	-1.05 dB
F5	10.0	MHz	-1.76 dB	F15	165.0	MHz	-4.66 dB
F6	15.0	MHz	-0.22 dB	F16	170.0	MHz	-16.9 dB
F7	25.0	MHz	-0.12 dB	F17	200.0	MHz	-85.0 dB
F8	(*) 50.0	MHz	-0.16 dB	F18	300.0	MHz	-88.5 dB
F9	(*) 75.0	MHz	-0.23 dB	F19	500.0	MHz	-98.4 dB
F10	87.5	MHz	-0.26 dB	F20	1000.0	MHz	-99.3 dB

TEST PERFORMED BY: R. HOGGATT DA 5 DATE 12/20/96

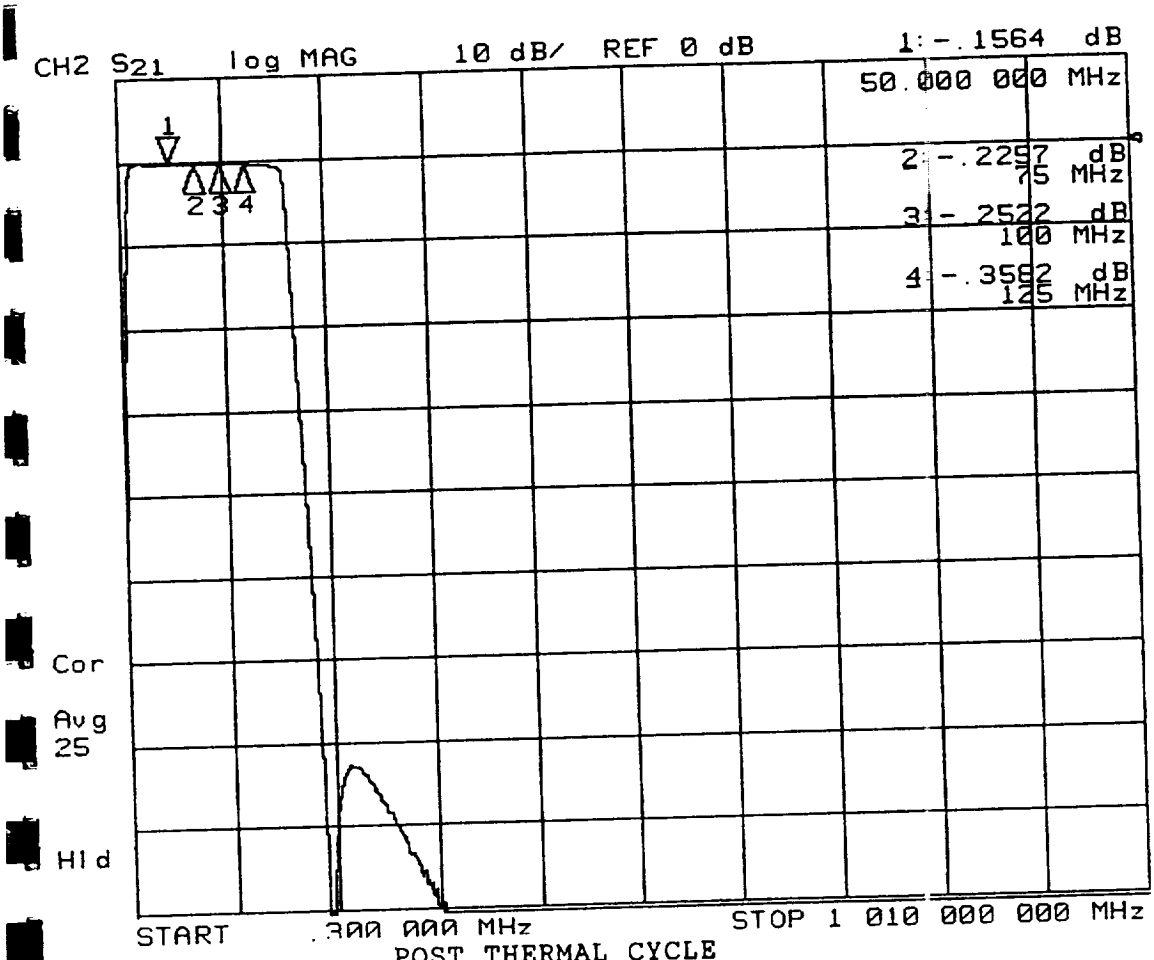
NOTE IF TEST WITNESSED BY AESD_ Not witnessed this time. DLD ———

***** END OF BANDPASS CHARACTERISTICS TEST *****

FUNCTIONAL PERFORMANCE TEST
ACCEPTANCE TEST PROCEDURE
63-0005-02 PARA 4.1

BRIEF TEST DESCRIPTION: THE TESTS DESCRIBED IN APPENDIX D PAGE 10 THRU PAGE 13 ARE PERFORMED TO DOCUMENT THE FUNCTIONAL PERFORMANCE OF THE UNIT AT THE CONCLUSION OF ALL ENVIRONMENTAL TESTING. THE TESTS ARE AS FOLLOWS AND IN ANY SEQUENCE:

a .) CENTER FREQUENCY (fc) PER ATP PARA 4.5.7 (PART OF 3.0 dB B/W TEST)
b.) 3.0 dB BANDWIDTH PER ATP PARA 4.5.3.
c.) OUT-OF-BAND REJECTION PER ATP PARA 4.5.5.
d) INSERTION LOSS PER ATP PARA 4.5.2
e) INSERTION LOSS VS TEMPERATURE PER ATP PARA 4.5.6.
f.) PASSBAND RIPPLE PER ATP PARA 4.5.4 (PART OF INSERTION LOSS TEST).
g.) VSWR PER ATP PARA 4.5.1.



POST THERMAL CYCLE
PASSBAND CHARACTERISTICS
SERIAL NO. P230-009
AMBIENT
OPR: R. HOGGATT DATE DEC 20 1996 Channel 2

MARKER PARAME		
MARKER 1	17.750000 MHz OFF	50.000000 MHz -.1564 dB
MARKER 2	157.250000 MHz OFF	75.000000 MHz -.2257 dB
MARKER 3	29.375000 MHz OFF	100.000000 MHz -.2522 dB
MARKER 4	145.625000 MHz OFF	125.000000 MHz -.3582 dB
MKR STIMULUS OFFSET	0.000000 MHz 0 dB	89.425802 MHz -3.2342 dB
REFERENCE MARKER	OFF	OFF
PLACEMENT	CONTINUOUS	CONTINUOUS
MARKER SEARCH	OFF	OFF
TARGET VALUE	-14 dB	-3 dB
MARKER WIDTH VALUE	-3 dB	-3 dB
	OFF	OFF
MARKER TRACKING	OFF	OFF

Channel 10 Bandpass Filter

IF Filter (S/N: 1331559-7, S/N: P233-003)

APPENDIX G **QUALIFICATION TEST REPORT**

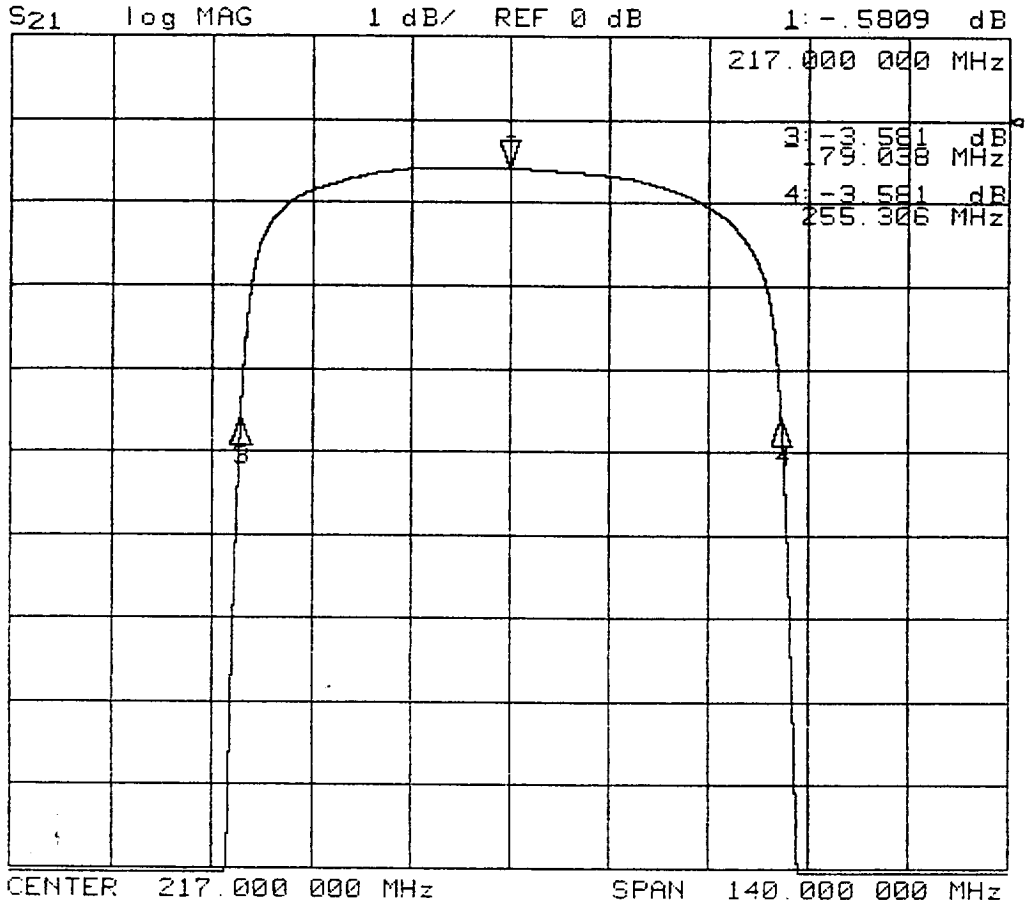
BANDPASS FILTER MODEL FX217-78-10SS1 S/N P233-003
AEROJET 1331559-7 REV. E

3.0 dB BANDWIDTH

QUALIFICATION TEST PROCEDURE 63-0005-010 PARA 4.5.3	-10°C	+15°C	+40°C
{7} UPPER 3.0 dB BANDEDGE	255.31 MHz (254.0-256.0)	255.11 Mhz (254.0-256.0)	254.83 MHz (254.0-256.0)
{8} LOWER 3.0 dB BANDEDGE	179.04 MHz (178.0-180.0)	178.87 Mhz (178.0-180.0)	178.71 MHz (178.0-180.0)
{9} 3.0 dB RELATIVE BANDWIDTH	76.27 MHz (74.0-78.0)	76.24 Mhz (74.0-78.0)	76.12 MHz (74.0-78.0)
{10} ADD {7} AND {8} ÷ 2 =	217.18 MHz (217.0 NOM)	216.99 MHz (217.0 NOM)	216.77 Mhz (217.0 NOM)
{10a} RECORD MEASURED TEMPERATURE	-11.7 °C (-15.0 TO -10.0)	+14.8 °C (12.5 TO 17.5)	+43.4 °C (40.0 TO 45.0)
{6} ATTACH TRANSMISSION LOSS PERFORMANCE X-Y PLOT	✓ (√)	✓ (√)	✓ (√)

PASSBAND RIPPLE

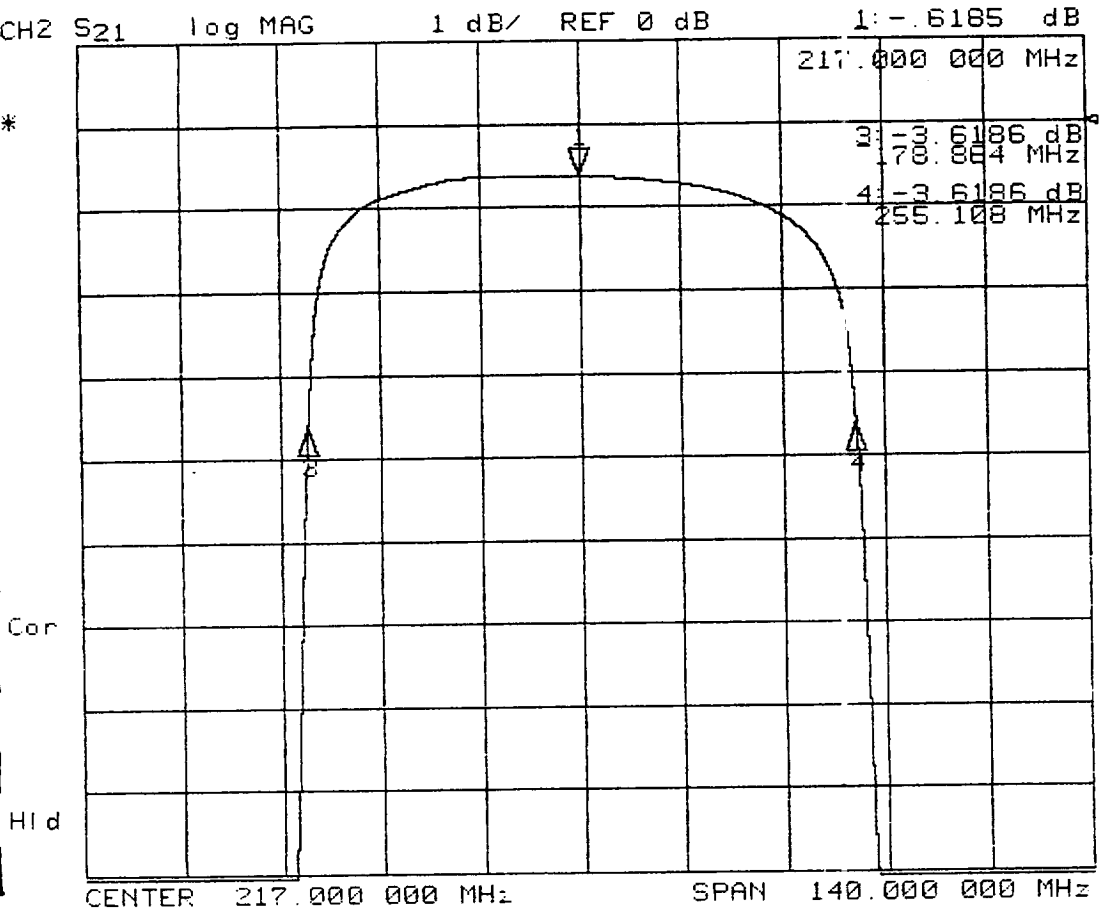
QUALIFICATION TEST PROCEDURE 63-0005-010 PARA 4.5.4	-10°C	+15°C	+40°C
{11a} MIN INSERTION LOSS FREQ	210.00MHz	208.95Mhz	213.50MHz
MIN INSERTION LOSS PERFORMANCE	-0.57 dB	-0.61 dB	-0.64 dB
{11b} 75% BW LOWER BANDEDGE FREQ	185.73 MHz	185.60Mhz	185.45MHz
75% BW LOWER BANDEDGE I.L. PERF	-1.00 dB	-1.06 dB	-1.11 dB
{11c} 75% BW UPPER BANDEDGE FREQ	244.23MHz	244.10Mhz	243.95MHz
75% BW UPPER BANDEDGE I.L. PERF	-1.00 dB	-1.06 dB	-1.11 dB
{11d} PERFORMANCE DELTA (I.L. @ {11b} - I.L. @ {11a})	0.43 dB	0.45 dB	0.47 dB
{11e} PERFORMANCE DELTA (I.L. @ {11c} - I.L. @ {11a})	0.43 dB	0.45 dB	0.47 dB



FINAL FUNCTIONAL PERFORMANCE
TRANSMISSION LOSS
SERIAL NO. P233-003
-10C DATA
OPR: R. HOGGATT DATE JAN 3 1 1997

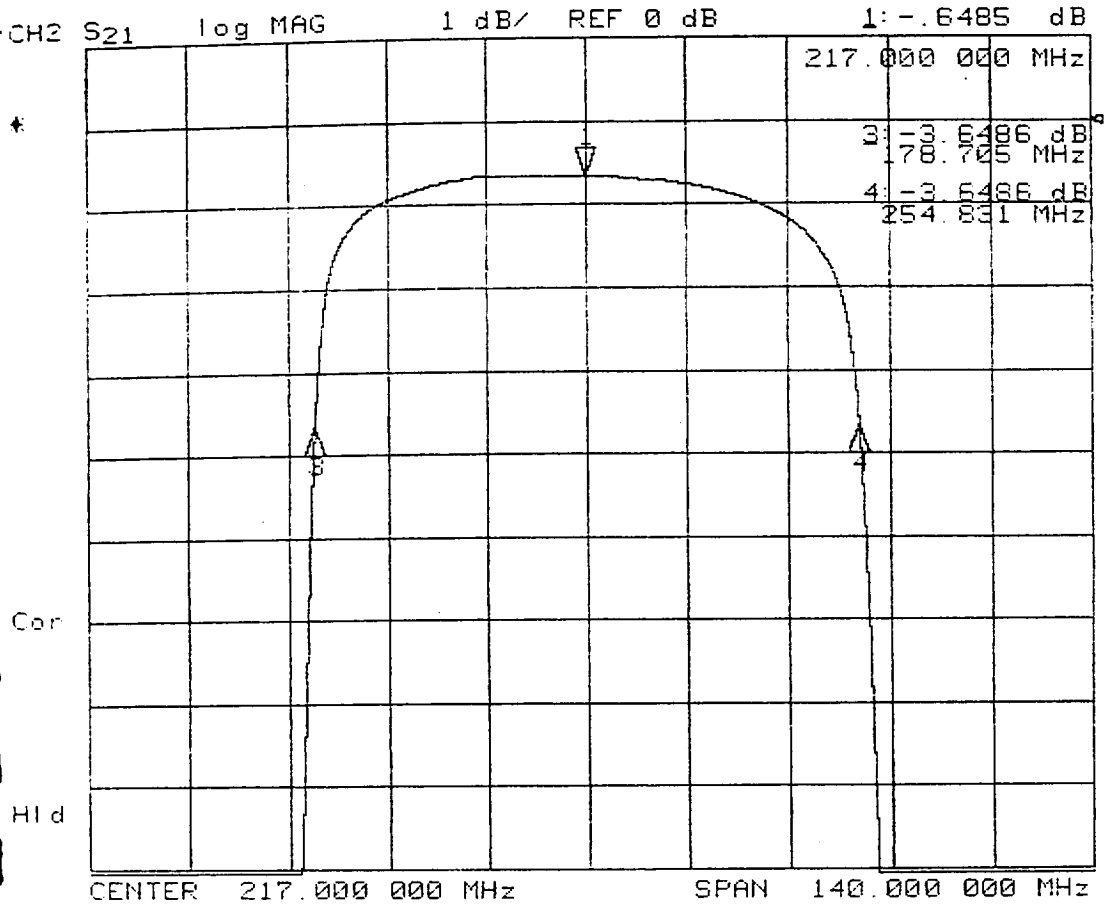
MARKER PARAMET annel 2

MARKER 1	181.900000 MHz OFF	217.000000 MHz -.5809 dB
MARKER 2	252.100000 MHz OFF	217.172566 MHz OFF
MARKER 3	187.750000 MHz OFF	179.038783 MHz -3.581 dB
MARKER 4	246.250000 MHz OFF	255.306349 MHz -3.581 dB
MKR STIMULUS OFFSET	0.000000 MHz 0 dB	89.425802 MHz -3.2342 dB
REFERENCE MARKER	OFF	OFF
PLACEMENT	CONTINUOUS	CONTINUOUS
MARKER SEARCH	OFF	OFF
TARGET VALUE	-14 dB	-3 dB
MARKER WIDTH VALUE	-3 dB	-3 dB
	OFF	OFF
MARKER TRACKING	OFF	OFF



FINAL FUNCTIONAL PERFORMANCE
TRANSMISSION LOSS
SERIAL NO. P233-003
+15C DATA
OPR: R. HOGGATT DATE JAN 31 1997

MARKER 1	181.900000 MHz OFF	217.000000 MHz -.6185 dB
MARKER 2	252.100000 MHz OFF	216.986525 MHz OFF
MARKER 3	187.750000 MHz OFF	178.864973 MHz -3.6186 dB
MARKER 4	246.250000 MHz OFF	255.108077 MHz -3.6186 dB
MKR STIMULUS OFFSET	0.000000 MHz 0 dB	89.425802 MHz -3.2342 dB
REFERENCE MARKER	OFF	OFF
PLACEMENT	CONTINUOUS	CONTINUOUS
MARKER SEARCH	OFF	OFF
TARGET VALUE	-14 dB	-3 dB
MARKER WIDTH VALUE	-3 dB	-3 dB
	OFF	OFF
MARKER TRACKING	OFF	OFF



FINAL FUNCTIONAL PERFORMANCE
TRANSMISSION LOSS
SERIAL NO. P233-003
+40C DATA
OPR: R. HOGGATT DATE JAN 31 1997

MARKER PARAMET annel 2

MARKER 1	181.900000 MHz OFF	217.000000 MHz -.6485 dB
MARKER 2	252.100000 MHz OFF	216.768498 MHz OFF
MARKER 3	187.750000 MHz OFF	178.705351 MHz -3.6486 dB
MARKER 4	246.250000 MHz OFF	254.831646 MHz -3.6486 dB
MKR STIMULUS OFFSET	0.000000 MHz 0 dB	89.425802 MHz -3.2342 dB
REFERENCE MARKER	OFF	OFF
PLACEMENT	CONTINUOUS	CONTINUOUS
MARKER SEARCH	OFF	OFF
TARGET VALUE	-14 dB	-3 dB
MARKER WIDTH VALUE	-3 dB	-3 dB
	OFF	OFF
MARKER TRACKING	OFF	OFF

BANDPASS FILTER MODEL FX217-78-10SS1 S/N P233-003
AEROJET 1331559-7 REV. E

PASSBAND RIPPLE (CON'T)

{11f} RECORD PASS/FAIL (0.7 dB MAX)	(PASS)/FAIL	(PASS)/FAIL	(PASS)/FAIL
{11g) ATTACH PASSBAND RIPPLE PERFORMANCE X-Y PLOT(S)	✓ (√)	✓ (√)	✓ (√)

OUT-OF-BAND REJECTION

QUALIFICATION TEST PROCEDURE 63-0005-010 PARA 4.5.5 Fc=217.0 MHz. REF {5A} FOR INSERTION LOSS @ Fc	-10°C	+15°C	+40°C
{12} WORST CASE REJECTION FROM 0.300 MHz TO 166.3 MHz	-45.3 dB (40.0 dB MIN)	-45.4 dB (40.0 dB MIN)	-45.5 dB (40.0 dB MIN)
{13a} WORST CASE REJECTION FROM 267.7 MHz TO 1000.0 MHz	-46.3 dB (40.0 dB MIN)	-46.7 dB (40.0 dB MIN)	-46.6 dB (40.0 dB MIN)
{13c} RECORD MEASURED TEMPERATURE	-11.9 °C (-15.0 TO -10.0)	+14.7 °C (12.5 TO 17.5)	+43.3 °C (40.0 TO 45.0)
{14} ATTACH REJECTION PERFORMANCE X-Y PLOT(S)	✓ (√)	✓ (√)	✓ (√)

TEST PERFORMED BY R. HOGGATT DATE 1/31/97 (JA 5)

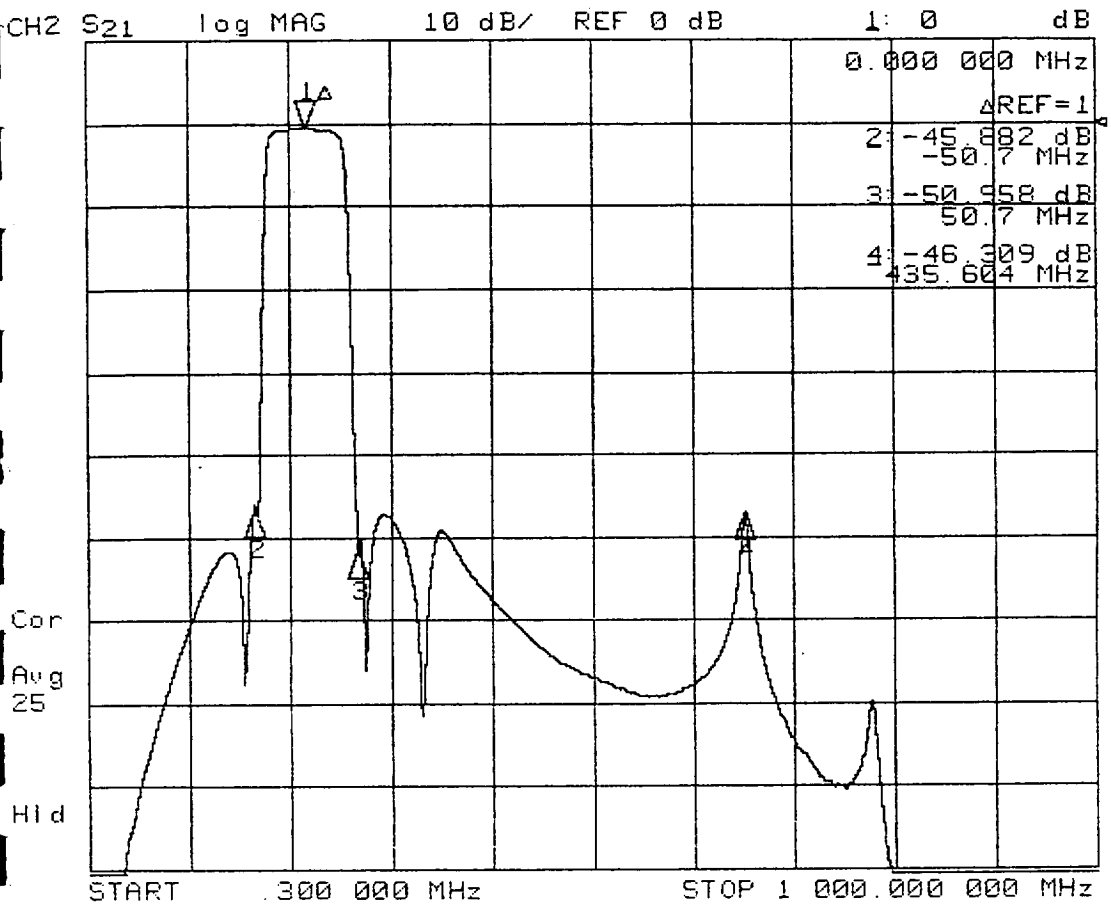
NOTE IF TEST WITNESSED BY AESD: _____ GSI: _____ Not Witnessed this time. DLD

***** END OF FUNCTIONAL PERFORMANCE TEST ****

OUTLINE AND MOUNTING DIMENSIONS VERIFICATION

{16} REFERENCE CUSTOMER DRAWING 1331559

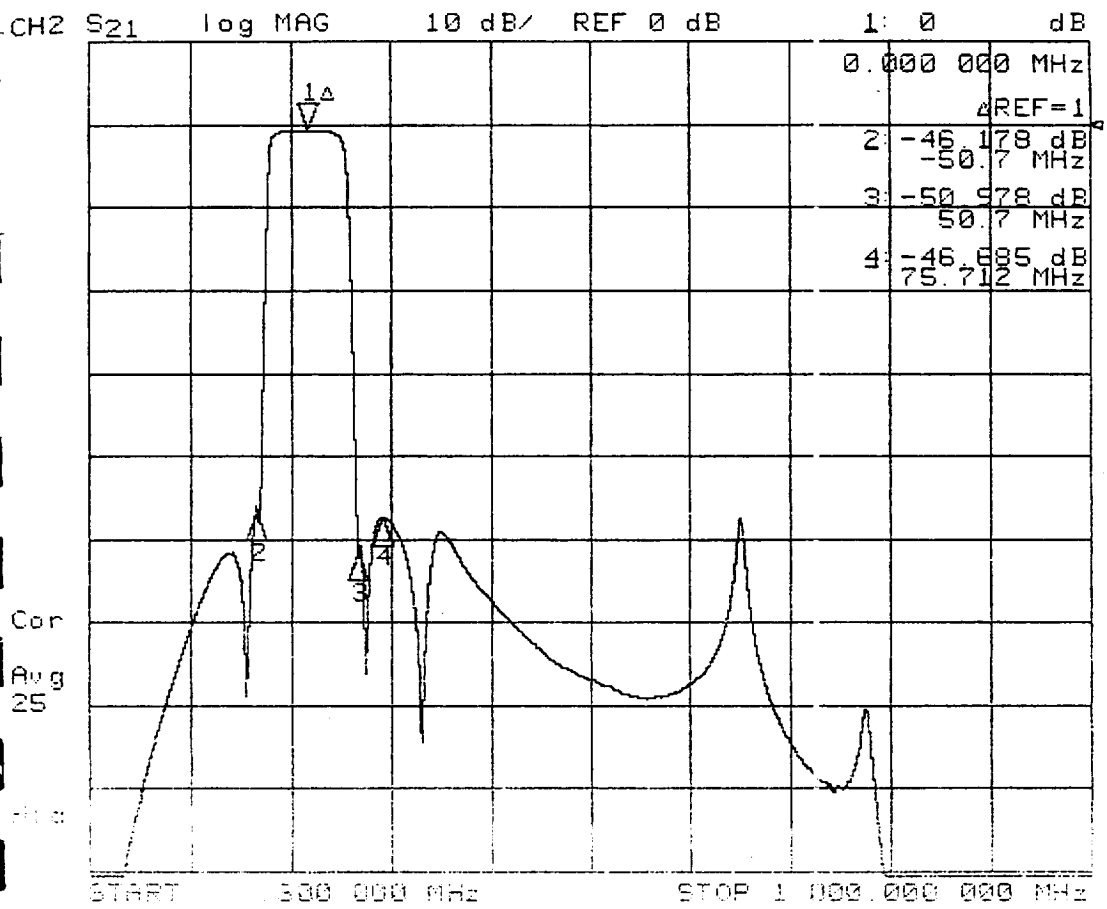
DESCRIPTION OF MEASUREMENT	DIMENSION AND TOLERANCE	ACTUAL MEASUREMENT
OVER ALL LENGTH	5.50 ± .03	5.504
MOUNTING HOLE CENTER	0.125 ± .010	.121
BETWEEN UPPER MOUNTING HOLES	5.250	5.248
BETWEEN LOWER MOUNTING HOLES	5.250	5.249



FINAL FUNCTIONAL PERFORMANCE
REJECTION PERFORMANCE
SERIAL NO. P233-003
-10C DATA
OPR: R. HOGGATT DATE JAN 31 1997

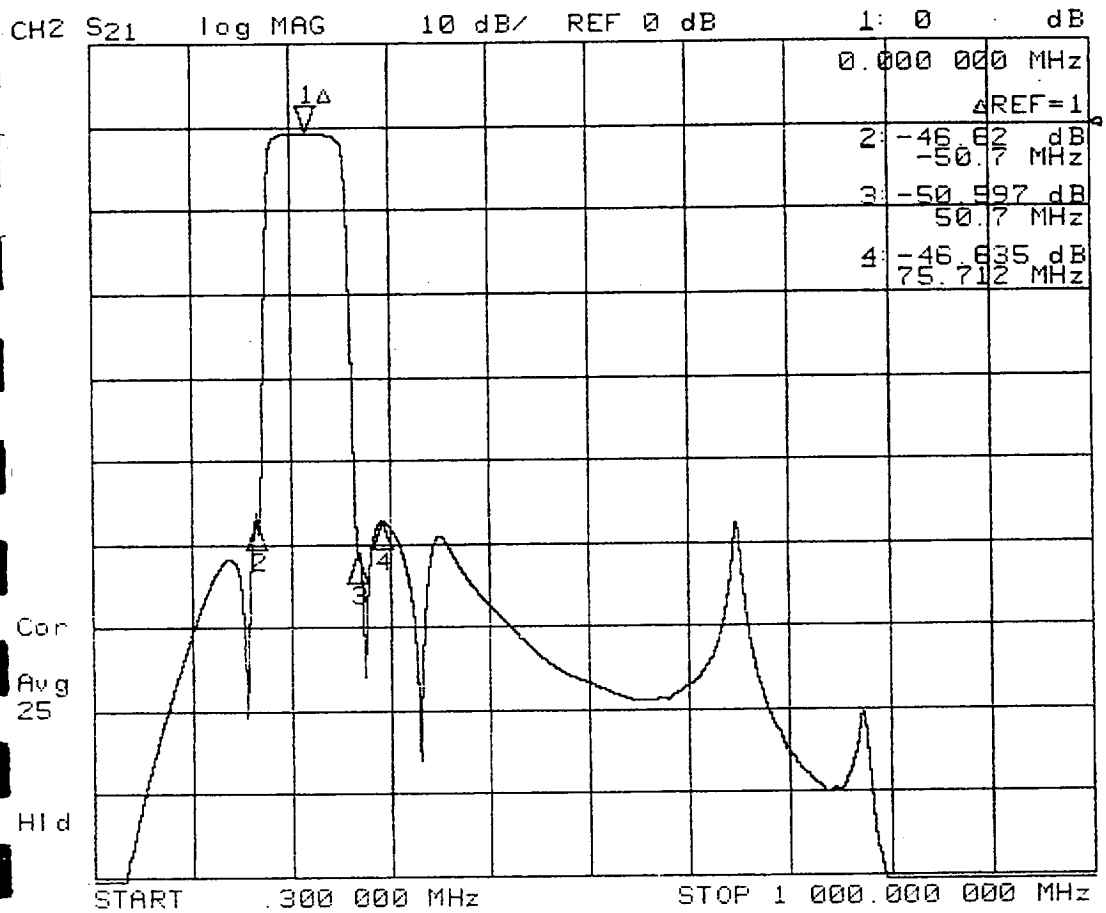
MARKER PARAMET		
MARKER 1	1000.000000 MHz OFF	217.000000 MHz 0 dB
MARKER 2	1000.000000 MHz OFF	166.300000 MHz -45.882 dB
MARKER 3	1000.000000 MHz OFF	267.700000 MHz -50.958 dB
MARKER 4	1000.000000 MHz OFF	652.604318 MHz -46.309 dB
MKR STIMULUS OFFSET	0.000000 MHz 0 dB	0.000000 MHz 0 dB
REFERENCE MARKER	OFF	MARKER 1
PLACEMENT	CONTINUOUS	CONTINUOUS
MARKER SEARCH	OFF	OFF
TARGET VALUE	-3 dB	-3 dB
MARKER WIDTH VALUE	-3 dB	-3 dB
	OFF	OFF
MARKER TRACKING	OFF	OFF

nnel 2



FINAL FUNCTIONAL PERFORMANCE
REJECTION PERFORMANCE
SERIAL NO. P233-003
+15C DATA
OPR: R. HOGGATT DATE JAN 31 1997

MARKER PARAMETI			nnel 2
MARKER 1	1000.000000 MHz OFF	217.000000 MHz 0 dB	
MARKER 2	1000.000000 MHz OFF	186.300000 MHz -46.178 dB	
MARKER 3	1000.000000 MHz OFF	267.700000 MHz -50.978 dB	
MARKER 4	1000.000000 MHz OFF	292.712313 MHz -46.685 dB	
MKR STIMULUS OFFSET	0.000000 MHz 0 dB	0.000000 MHz 0 dB	
REFERENCE MARKER	OFF	MARKER 1	
PLACEMENT	CONTINUOUS	CONTINUOUS	
MARKER SEARCH	OFF	OFF	
TARGET VALUE	-3 dB	-3 dB	
MARKER WIDTH VALUE	-3 dB	-3 dB	
	OFF	OFF	
MARKER TRACKING	OFF	OFF	



FINAL FUNCTIONAL PERFORMANCE
REJECTION PERFORMANCE
SERIAL NO. P233-003
+40C DATA
OPR: R. HOGGATT DATE JAN 31 1997 annel 2

MARKER PARAMET		
MARKER 1	1000.000000 MHz OFF	217.000000 MHz 0 dB
MARKER 2	1000.000000 MHz OFF	166.300000 MHz -46.62 dB
MARKER 3	1000.000000 MHz OFF	267.700000 MHz -50.597 dB
MARKER 4	1000.000000 MHz OFF	292.712287 MHz -46.635 dB
MKR STIMULUS OFFSET	0.000000 MHz 0 dB	0.000000 MHz 0 dB
REFERENCE MARKER	OFF	MARKER 1
PLACEMENT	CONTINUOUS	CONTINUOUS
MARKER SEARCH	OFF	OFF
TARGET VALUE	-3 dB	-3 dB
MARKER WIDTH VALUE	-3 dB	-3 dB
	OFF	OFF
MARKER TRACKING	OFF	OFF

APPENDIX G

QUALIFICATION TEST REPORT

BANDPASS FILTER MODEL FX217-78-10SS1 S/N P233-003
AEROJET 1331559-7 REV. E

BANDPASS CHARACTERISTICS MEASUREMENT

PER QTP PARA 4.6
(REF: AE-24687, PARA 4.8.2)

RECORD THE AMBIENT ROOM TEMPERATURE. +24.4 °C (+19°C TO +29.0°C)

{15} ATTACH PASSBAND PERFORMANCE X-Y PLOT ✓ (√)

{24} TEST POINT MATRIX

REF	FREQ	UNIT	VALUE	REF	FREQ	UNIT	VALUE
F1	1.0	MHz	-104.2 dB	F11	217.0	MHz	-0.61 dB
F2	10.0	MHz	-105.9 dB	F12	(*) 224.0	MHz	-0.63 dB
F3	100.0	MHz	-61.0 dB	F13	(*) 230.0	MHz	-0.69 dB
F4	150.0	MHz	-55.2 dB	F14	240.0	MHz	-0.90 dB
F5	170.0	MHz	-45.7 dB	F15	250.0	MHz	-1.56 dB
F6	178.0	MHz	-6.09 dB	F16	256.0	MHz	-6.08 dB
F7	184.0	MHz	-1.24 dB	F17	264.0	MHz	-38.6 dB
F8	194.0	MHz	-0.76 dB	F18	300.0	MHz	-47.9 dB
F9	(*) 204.0	MHz	-0.63 dB	F19	500.0	MHz	-66.7 dB
F10	(*) 210.0	MHz	-0.62 dB	F20	1000.0	MHz	-102.5 dB

TEST PERFORMED BY: R. Hoggatt DATE 1/31/17 (DA 5)

NOTE IF TEST WITNESSED BY AESD _____ GSI _____ Not Witnessed this time. DLD

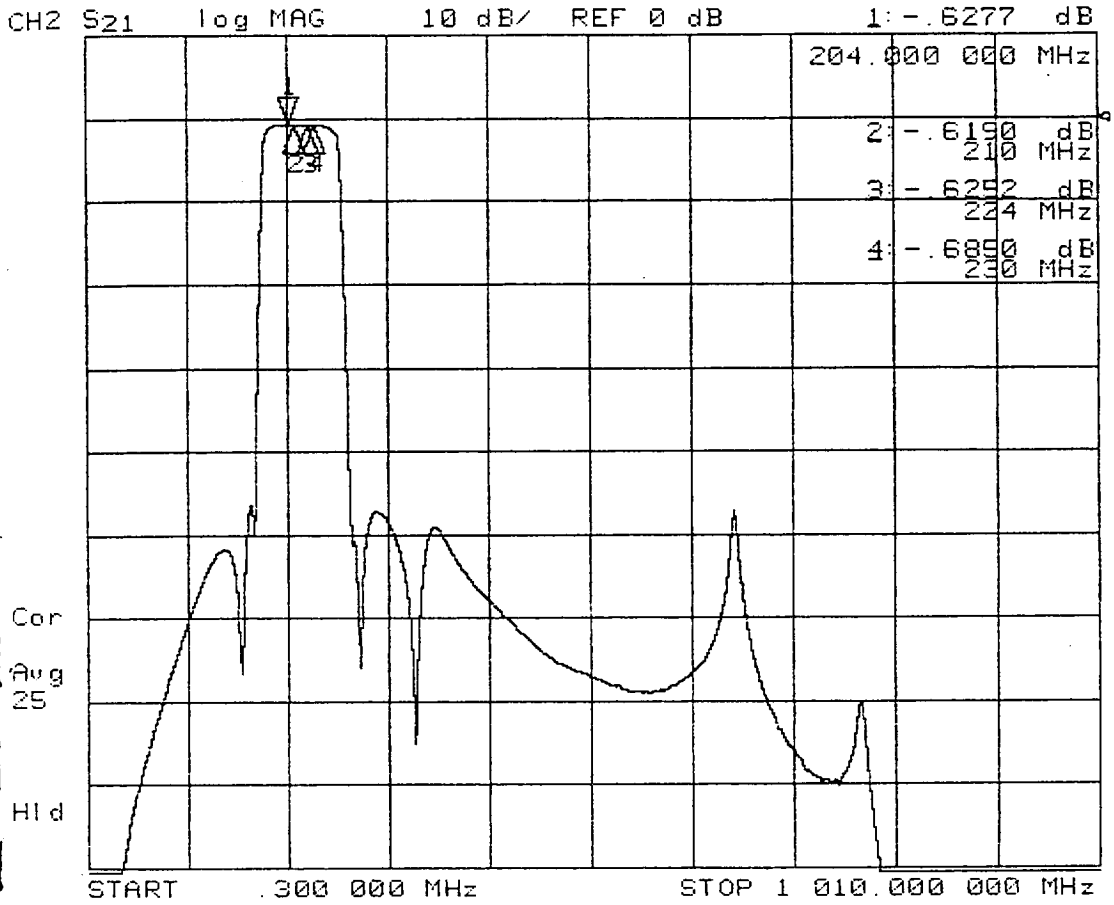
***** END OF BANDPASS CHARACTERISTICS TEST *****

FUNCTIONAL PERFORMANCE TEST

QUALIFICATION TEST PROCEDURE
63-0005-010 PARA 4.1

BRIEF TEST DESCRIPTION: THE TESTS DESCRIBED IN APPENDIX G PAGE 10 THRU PAGE 13 ARE PERFORMED TO DOCUMENT THE FUNCTIONAL PERFORMANCE OF THE UNIT AT THE CONCLUSION OF ALL ENVIRONMENTAL TESTING. THE TESTS ARE AS FOLLOWS AND IN ANY SEQUENCE:

a.) VSWR PER QTP PARA 4.5.1.
b.) INSERTION LOSS PER QTP PARA 4.5.2
c.) INSERTION LOSS VS TEMPERATURE PER QTP PARA 4.5.6.
d.) 3.0 dB BANDWIDTH PER QTP PARA 4.5.3.
e.) CENTER FREQUENCY (fc) PER QTP PARA 4.5.7 (PART OF 3.0 dB B/W TEST)
f.) PASSBAND RIPPLE PER QTP PARA 4.5.4 (PART OF INSERTION LOSS TEST).
g.) OUT-OF-BAND REJECTION PER QTP PARA 4.5.5.



POST THERMAL CYCLE
PASSBAND CHARACTERISTICS
SERIAL NO. P233-003
AMBIENT
MARKER PARAMET OPR: R. HOGGATT DATE JAN 3 1 1997 annel 2

MARKER 1	1000.000000 MHz OFF	204.000000 MHz -.6277 dB
MARKER 2	1000.000000 MHz OFF	210.000000 MHz -.6190 dB
MARKER 3	1000.000000 MHz OFF	224.000000 MHz -.6252 dB
MARKER 4	1000.000000 MHz OFF	230.000000 MHz -.6850 dB
MKR STIMULUS OFFSET	0.000000 MHz 0 dB	0.000000 MHz 0 dB
REFERENCE MARKER	OFF	OFF
PLACEMENT	CONTINUOUS	CONTINUOUS
MARKER SEARCH	OFF	OFF
TARGET VALUE	-3 dB	-3 dB
MARKER WIDTH VALUE	-3 dB	-3 dB
	OFF	OFF
MARKER TRACKING	OFF	OFF

Channel 11 Bandpass Filter

SAW Filter (S/N: 1331576-1, S/N: B05)

ELECTRICAL TEST DATA SHEET

AEROJET PART: 1331576-1 PHONON PART: 100823 SERIAL: B05

TESTED BY: 210 TITLE: Test Tech DATE: 4/13/99 TIME: 3:30 pm

TEST: FINAL FUNCTIONAL

EQUIPMENT: HP 8753D SERIAL: 3410A04374 CAL DUE: 1/29/99

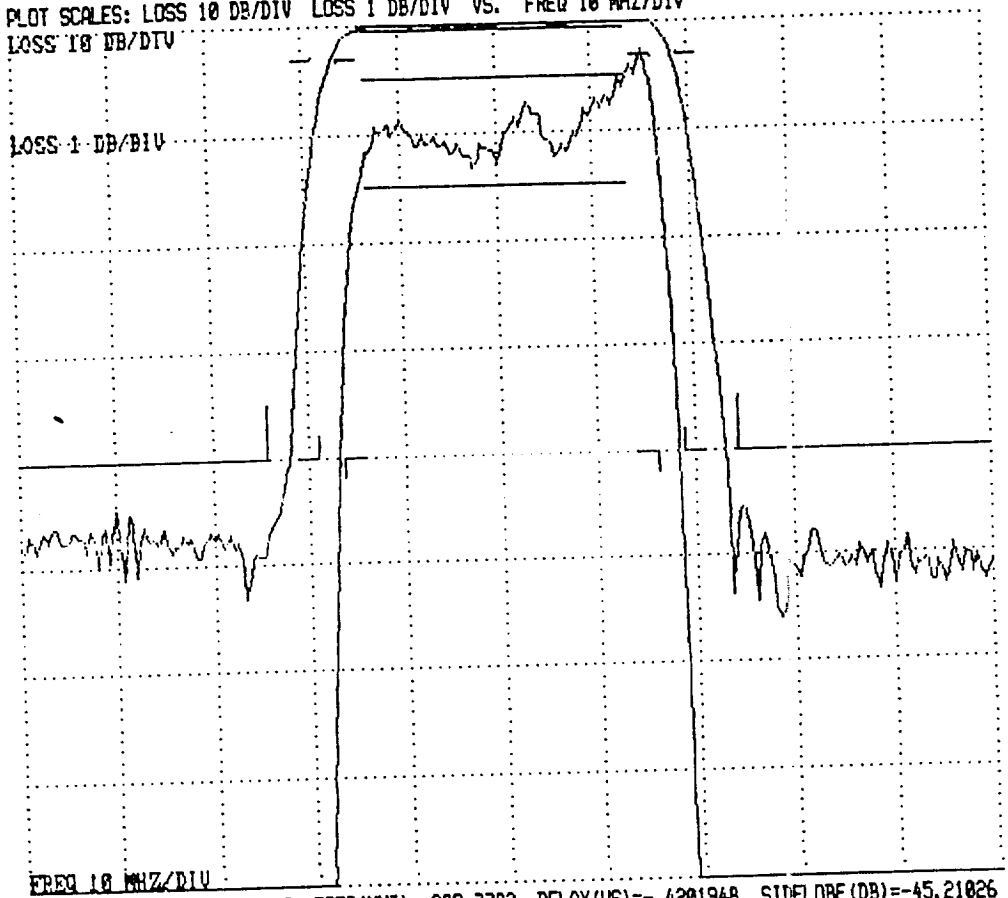
HP 3478A SERIAL: 2136A03127 CAL DUE: 7/7/98

PARAGRAPH REQ.	PARAGRAPH Q/ATP	REQUIREMENT TITLE	DATA		P/F
3.2.1.1	5.2.1	OPERATING TEMPERATURE	-5.1	C	P
3.2.1.3	5.2.3	CENTER FREQUENCY &			
3.2.1.4		CENTER FREQUENCY STABILITY			
		LO: 273.335/275.065 MHz	274.931	MHz	P
		HI: 369.335/371.065 MHz	370.696	MHz	P
3.2.1.5	5.2.4	3 dB BANDWIDTH:			
		LO: 34/36 MHz	34.912	MHz	P
		HI: 34/36 MHz	35.420	MHz	P
3.2.1.6	5.2.5	PASSBAND SYMMETRY			
		LO: /0.5 dB	0.4	dB	P
		HI: /0.5 dB	0.3	dB	P
3.2.1.7	5.2.6	PASSBAND RIPPLE			
		260.7-287.7 MHz: /1.0 dB	0.7	dB	P
		356.7-383.7 MHz: /1.0 dB	0.5	dB	P
3.2.1.8	5.2.7	INSERTION LOSS			
		LO: 27.8/30.2 dB	28.7	dB	P
		HI: 27.8/30.2 dB	29.1	dB	P
3.2.1.9	5.2.8	INSERTION LOSS VARIATION			
		LO: -0.4/0.4 dB	-0.2	dB	P
		HI: -0.4/0.4 dB	0.1	dB	P
3.2.1.10	5.2.9	AMPLITUDE BALANCE			
		LO,HI: /0.5 dB	0.4	dB	P
3.2.1.11	5.2.10	OUT-OF-BAND REJECTION			
		BAND	PEAK(dB)	WIDTH(MHz)	
		WIDE: 1-225,420-1000 MHz:	44.6	0.000	
		DUAL: 225.000-249.935, 298.465-345.935, 394.465-420.00 MHz:	42.2	0.000	
		PEAK: 35.0/ dB	42.2	dB	P
		WIDTH: /7.2 MHz		0.000 MHz	P
3.2.1.12	5.2.11	SHAPE FACTOR			
		LO: /1.30 Unitless	1.29	Unitless	P
		HI: /1.30 Unitless	1.26	Unitless	P
3.2.1.14	5.2.12	VSWR (RETURN LOSS)			
		260.7-287.7,356.7-383.7 MHz			
		DUAL S11: 7.5/ dB	11.2	dB	P
		DUAL S22: 7.5/ dB	8.9	dB	P
4.8.2	5.2.14	LIMITED FUNCTIONAL TESTS			
		CENTER FREQUENCY: -0.2/0.2 MHz	0	MHz	P
		3 dB BANDWIDTH: -0.72/0.72 MHz	0	MHz	P
		INSERTION LOSS: -0.5/0.5 dB	0	dB	P
NE	5.2.15	DATA SHEET SUMMARY (PASS/FAIL)	P		P

PHONON CORPORATION
7 HERMAN DRIVE
SIMSBURY, CT 06070

CAGE: 6Y858
TEL: 203-651-0211
FAX: 203-651-8618

PHONON CORPORATION
FILE=1ACBB05A.DAT 13:14:23 04-13-1998
PN_100828_823 FINAL_FUNCTIONAL TEMP:C FLIGHT5_3FUNCT /N DUAL_SXX
04-13-1998 HP8753,SSCF,SSFFIX,SSREF
FREQUENCY(MHZ): CENTER= 274.2 WIDTH= 100 INCR.= .4 SYSTEM BANDWIDTH= 27
REFERENCES: LOSS(DB)= 28.73701 PHASE(DEG)=-55899.52 DELAY(US)= 0 SLOPE(US/MHZ)= 0
RMS ERRORS: LOSS(DB)= .1770983 PHASE(DEG)= 1171.884
PLOT SCALES: LOSS 10 DB/DIV LOSS 1 DB/DIV VS. FREQ 10 MHZ/DIV



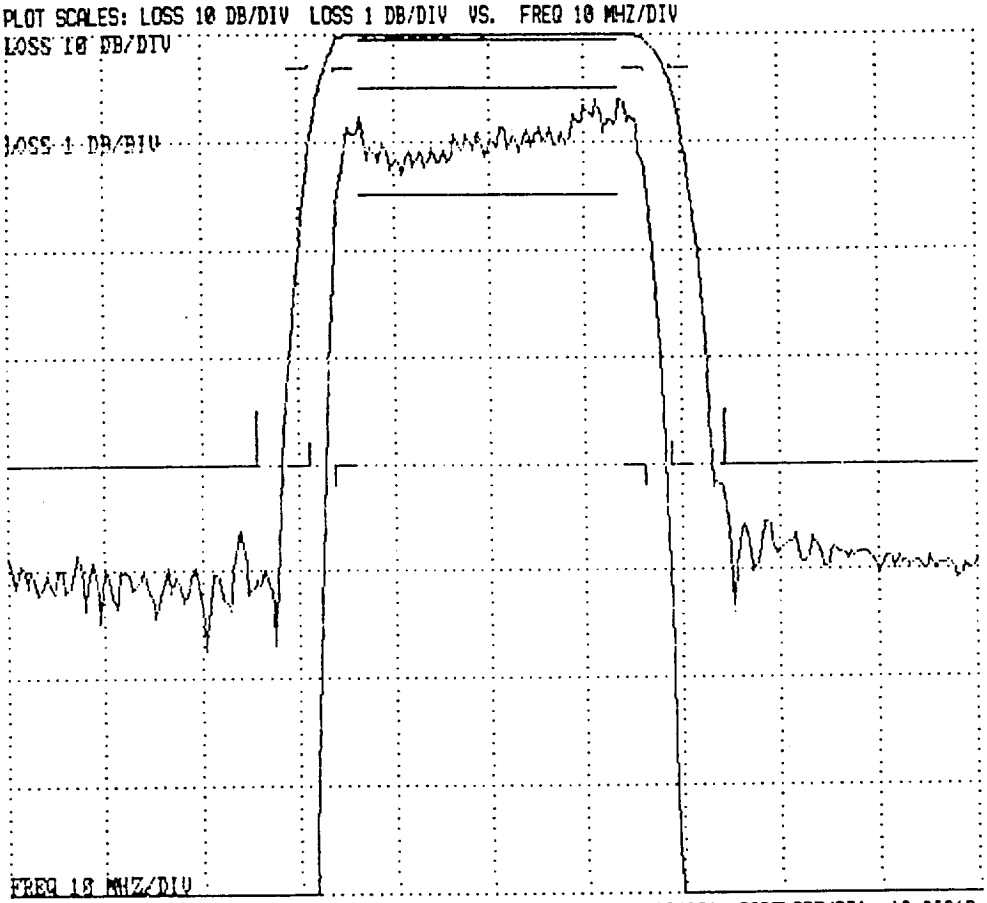
PEAK: LEVEL(DB)= 28.00136 FREQ(MHZ)= 289.3382 DELAY(US)=-.4201948 SIDELOBE(DB)=-45.21026
ENERGY: LEVEL(DB)= 28.86438 CENTER(MHZ)= 275.2506 WIDTH(MHZ)= 36.44714 SKEW(MHZ)=-.5400804

L(DB)	LO(MHZ)	HI(MHZ)	CTR(MHZ)	WID(MHZ)	AV-CTR(MHZ)	AV-WID(MHZ)	AV-SL(DB)	LOX(MHZ)	HIX(MHZ)
-0.74	289.33823	289.33823	289.33823	0.00000	289.33823	0.00000	0.00	289.33823	289.33823
0.50	259.94012	291.11542	275.52777	31.17529	275.90921	3 .54483	-12.55	259.94012	291.11542
1.00	258.91873	291.51776	275.21826	32.59903	275.55258	32.89660	-14.34	258.91873	291.51776
2.00	258.04205	292.00641	275.02423	33.96436	275.40164	33.74654	-16.06	258.04205	292.00641
3.00	257.47537	292.38727	274.93134	34.91190	275.39441	34.20245	-17.40	257.47537	292.38727
4.00	256.99536	292.68661	274.84100	35.69125	275.29459	34.72795	-19.88	256.99536	292.68661
5.00	256.63028	292.94583	274.78806	36.31555	275.29459	34.72795	-19.83	256.63028	292.94583
6.00	256.31845	293.16824	274.74335	36.84979	275.28928	34.97260	-21.79	256.31845	293.16824
10.00	255.42142	293.93948	274.68045	38.51807	275.27124	35.25172	-26.39	255.42142	293.93948
20.00	253.90335	295.26477	274.58405	41.36142	275.25116	35.38296	-37.40	253.90335	295.26477
30.00	253.00778	296.25912	274.63345	43.25134	275.25107	35.39209	-45.50	253.00778	296.25912
40.00	252.24182	297.26138	274.75159	45.01956	275.25095	35.39287	-48.24	252.24182	297.26138

BAND(MHZ)	260.700	287.700
LMIN(DB)	-0.48	
LMAX(DB)	0.34	
LDEL(DB)	0.81	
PMIN(DEG)	-1996.51	
PMAX(DEG)	1997.41	
PDEL(DEG)	3993.92	

File: 1ACBB05A.DAT Passband Symmetry = 0.4 dB

PHONON CORPORATION
FILE=1CC8B05A.DAT 13:14:34 04-13-1998
PN_100328_823 FINAL_FUNCTIONAL TEMP:C FLIGHT5_3FUNCT /N DUAL_SXX
04-13-1998 HP8753,SSCF,SSFFIX,SSREF
FREQUENCY(MHZ): CENTER= 370.2 WIDTH= 100 INCR.= .4 SYSTEM BANDWIDTH= 27
REFERENCES: LOSS(DB)= 29.11791 PHASE(DEG)=-63204.92 DELAY(US)= 0 SLOPE(US/MHZ)= 0
RMS ERRORS: LOSS(DB)= .1527099 PHASE(DEG)= 1129.435
PLOT SCALES: LOSS 10 DB/DIV LOSS 1 DB/DIV VS. FREQ 10 MHZ/DIV



PEAK: LEVEL(DB)= 28.69306 FREQ(MHZ)= 383.9956 DELAY(US)=-.4069061 SIDELOBE(DB)=-42.06219
ENERGY: LEVEL(DB)= 29.26755 CENTER(MHZ)= 370.893 WIDTH(MHZ)= 36.97764 SKEW(MHZ)=-.3097706

L(DB)	LO(MHZ)	HI(MHZ)	CTR(MHZ)	WID(MHZ)	AV-CTR(MHZ)	AV-WID(MHZ)	AV-SL(DB)	LOX(MHZ)	HIX(MHZ)
-0.42	383.99561	383.99561	383.99561	0.00000	383.99561	0.00000	0.00	383.99561	383.99561
0.50	354.24149	386.67752	370.45950	32.43604	370.79581	32.49475	-13.23	354.24149	386.67752
1.00	353.93112	387.10416	370.51764	33.17303	370.77820	33.17306	-14.21	353.93112	387.10416
2.00	353.40738	387.91476	370.66107	34.50739	370.90543	34.03949	-15.92	353.40738	387.91476
3.00	352.98627	388.40588	370.69608	35.41962	370.78525	34.71448	-18.08	352.98627	388.40588
4.00	352.67908	388.85034	370.76471	36.17126	370.87814	34.89650	-18.89	352.67908	388.85034
5.00	352.39758	389.18533	370.79144	36.78775	370.87509	35.19197	-20.77	352.39758	389.18533
6.00	352.15253	389.48077	370.81665	37.32825	370.87585	35.40493	-22.94	352.15253	389.48077
10.00	351.41129	390.31625	370.86377	38.90497	370.90424	35.59459	-26.73	351.41129	390.31625
20.00	350.19873	391.74142	370.97009	41.54269	370.89102	35.71635	-38.22	350.19873	391.74142
30.00	349.22324	392.64508	370.93414	43.42184	370.89294	35.72417	-47.37	349.22324	392.64508
40.00	348.54559	393.25940	370.90250	44.71381	370.89285	35.72453	-49.13	348.54559	393.25940

BAND(MHZ)	356.700	383.700
LMIN(DB)	-0.39	
LMAX(DB)	0.30	
LDEL(DB)	0.69	
PMIN(DEG)	-1929.92	
PMAX(DEG)	1920.00	
PDEL(DEG)	3849.92	

File: 1CC8B05A.DAT Passband Symmetry = 0.3 dB

ELECTRICAL TEST DATA SHEET

AEROJET PART: 1331576-1 PHONON PART: 100823 SERIAL: 005

TESTED BY: 210 TITLE: Test Tech DATE: 4/13/99 TIME: 3:30pm

TEST: FINAL FUNCTIONAL

EQUIPMENT: HP 8753D SERIAL: 3410A04374 CAL DUE: 1/29/99

HP 3478A SERIAL: 2136A03127 CAL DUE: 7/7/98

PARAGRAPH REQ.	PARAGRAPH Q/ATP	REQUIREMENT TITLE	DATA		P/F
3.2.1.1	5.2.1	OPERATING TEMPERATURE	15.0	C	P
3.2.1.3	5.2.3	CENTER FREQUENCY &			
3.2.1.4		CENTER FREQUENCY STABILITY			
		LO: 273.335/275.065 MHz	274.436	MHz	P
		HI: 369.335/371.065 MHz	370.073	MHz	P
3.2.1.5	5.2.4	3 dB BANDWIDTH:			
		LO: 34/36 MHz	34.858	MHz	P
		HI: 34/36 MHz	35.334	MHz	P
3.2.1.6	5.2.5	PASSBAND SYMMETRY			
		LO: /0.5 dB	0.3	dB	P
		HI: /0.5 dB	0.2	dB	P
3.2.1.7	5.2.6	PASSBAND RIPPLE			
		260.7-287.7 MHz: /1.0 dB	0.7	dB	P
		356.7-383.7 MHz: /1.0 dB	0.5	dB	P
3.2.1.8	5.2.7	INSERTION LOSS			
		LO: 27.8/30.2 dB	28.1	dB	P
		HI: 27.8/30.2 dB	29.1	dB	P
3.2.1.9	5.2.8	INSERTION LOSS VARIATION			
		LO: -0.4/0.4 dB	0.0	dB	P
		HI: -0.4/0.4 dB	0.1	dB	P
3.2.1.10	5.2.9	AMPLITUDE BALANCE			
		LO,HI: /0.5 dB	0.	dB	P
3.2.1.11	5.2.10	OUT-OF-BAND REJECTION			
		BAND	PEAK(dB)	WIDTH(MHz)	
		WIDE: 1-225,420-1000 MHz:	44.4	0.000	
		DUAL: 225.000-249.935, 298.465-345.935, 394.465-420.00 MHz:	44.4	0.000	
		PEAK: 35.0/ dB	44.4	cB	P
		WIDTH: /7.2 MHz		0.000 MHz	P
3.2.1.12	5.2.11	SHAPE FACTOR			
		LO: /1.30 Unitless	1.29	Unitless	P
		HI: /1.30 Unitless	1.26	Unitless	P
3.2.1.14	5.2.12	VSWR (RETURN LOSS)			
		260.7-287.7,356.7-383.7 MHz			
		DUAL S11: 7.5/ dB	11.6	dB	P
		DUAL S22: 7.5/ dB	8.9	dB	P
4.8.2	5.2.14	LIMITED FUNCTIONAL TESTS			
		CENTER FREQUENCY: -0.2/0.2 MHz	+0.134	MHz	P
		3 dB BANDWIDTH: -0.72/0.72 MHz	+0.022	MHz	P
		INSERTION LOSS: -0.5/0.5 dB	-0.1	dB	P
NONE	5.2.15	DATA SHEET SUMMARY (PASS/FAIL)	P (PP)		

PHONON CORPORATION
7 HERMAN DRIVE
SIMSBURY, CT 06070

CAGE: 6Y858
TEL: 203-651-0211
FAX: 203-651-8618

PHONON CORPORATION

FILE=1AR8805A.DAT 13:26:03 04-13-1998

PN_100828_823 FINAL_FUNCTIONAL TEMP:R FLIGHT5_3FUNCT /N DUAL_SXX

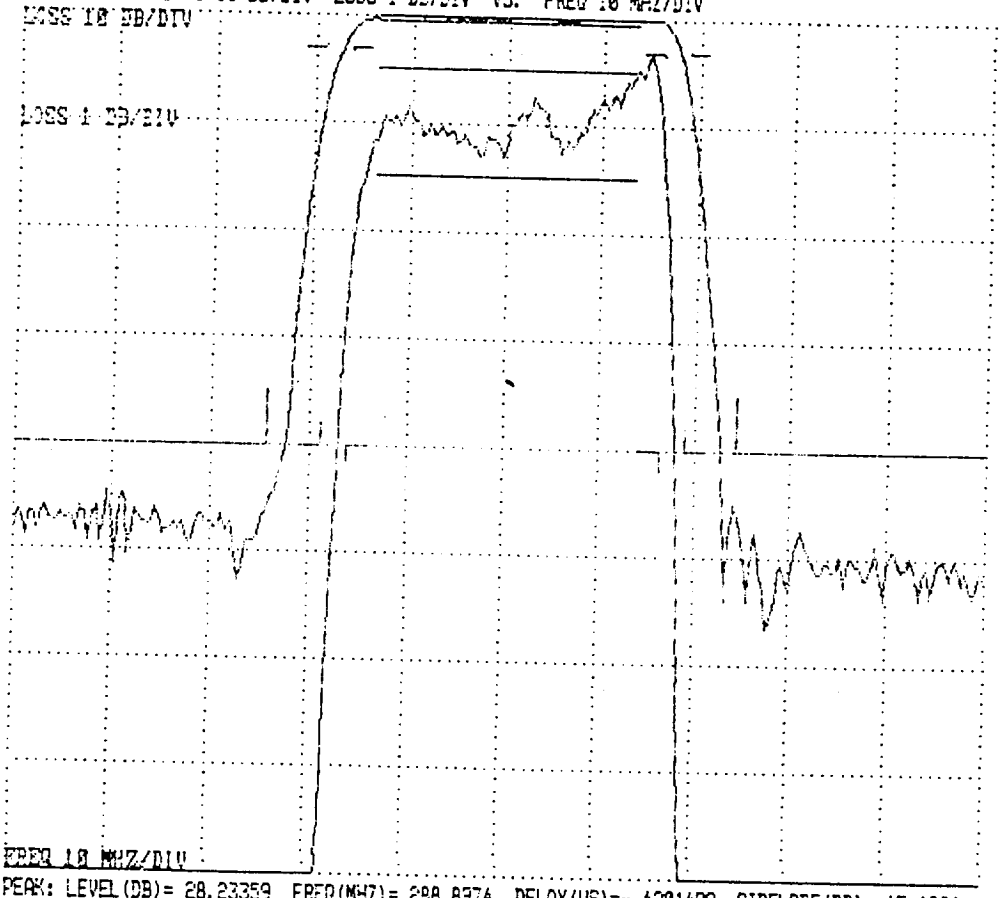
04-13-1998 HP8753,SSCF,SSFFIX,SSREF

FREQUENCY(MHZ): CENTER= 274.2 WIDTH= 100 INCR.= .4 SYSTEM BANDWIDTH= 27

REFERENCES: LOSS(DB)= 28.92525 PHASE(DEG)=-55399.88 DELAY(US)= 0 SLOPE(US/MHZ)= 0

RMS ERRORS: LOSS(DB)= .1785848 PHASE(DEG)= 1173.674

PLOT SCALES: LOSS 10 DB/DIV LOSS 1 DB/DIV VS. FREQ 10 MHZ/DIV



PEAK: LEVEL(DB)= 28.23359 FREQ(MHZ)= 288.8974 DELAY(US)=-.4201499 SIDELOBE(DB)=-45.1824

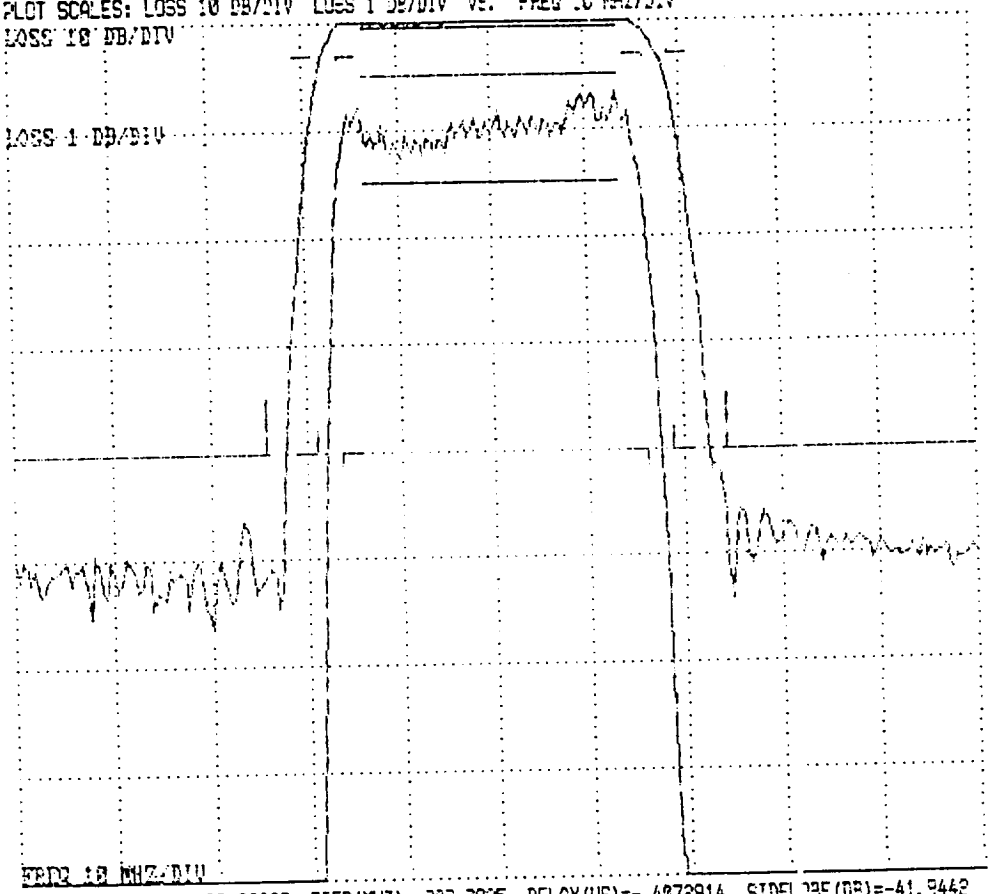
ENERGY: LEVEL(DB)= 29.05831 CENTER(MHZ)= 274.7856 WIDTH(MHZ)= 36.40797 SKEW(MHZ)=-.4892818

L(DB)	LO(MHZ)	HI(MHZ)	CTR(MHZ)	WID(MHZ)	AV-CTR(MHZ)	AV-WID(MHZ)	AV-SL(DB)	LOX(MHZ)	HIX(MHZ)
-0.69	288.89737	288.89737	288.89737	0.00000	288.89737	0.00000	0.00	288.89737	288.89737
0.50	259.55095	290.63290	275.09192	31.08194	275.47180	31.43358	-12.62	259.55095	290.63290
1.00	258.51782	291.04932	274.78357	32.53149	275.11261	32.77702	-14.42	258.51782	291.04932
2.00	257.63828	291.54105	274.58966	33.90277	274.95718	33.61732	-16.16	257.63828	291.54105
3.00	257.07034	291.92075	274.49554	34.85040	274.94574	34.86495	-17.51	257.07034	291.92075
4.00	256.59116	292.22659	274.40887	35.63544	274.84140	34.58247	-20.01	256.59116	292.22659
5.00	256.22443	292.47775	274.35107	36.25333	274.84140	34.58247	-19.97	256.22443	292.47775
6.00	255.91243	292.70718	274.30981	36.79475	274.83240	34.82012	-21.93	255.91243	292.70718
10.00	255.01526	293.47705	274.24515	38.46179	274.80942	35.09089	-26.54	255.01526	293.47705
20.00	253.49709	294.80344	274.15027	41.30635	274.78556	35.21801	-37.61	253.49709	294.80344
30.00	252.59882	295.50521	274.20203	43.20639	274.78589	35.22703	-45.71	252.59882	295.80521
40.00	251.83350	295.81238	274.32300	44.97878	274.78598	35.22740	-48.12	251.83350	295.81238

BAND(MHZ)	260.700	287.700
LMIN(DB)	-0.49	
LMAX(DB)	0.34	
LDEL(DB)	0.83	
PMIN(DEG)	-1998.04	
PMAX(DEG)	2002.50	
PDEL(DEG)	4020.54	

File: 1AR8805A.DAT Passband Symmetry = 0.2 dB

PHONON CORPORATION
FILE=1CR83B5A.DAT 13:26:45 04-13-1998
PN_100828_823 FINAL_FUNCTIONAL TEMP:R FLIGHT5_3FUNCT /N DUAL_SXX
04-13-1998 HP8753,SSCF,SSFFIX,SSREF
FREQUENCY(MHZ): CENTER= 370.2 WIDTH= 100 INCR.= .4 SYSTEM BANDWIDTH= 27
REFERENCES: LOSS(DB)= 29.03694 PHASE(DEG)=-52723.9 DELAY(US)= 0 SLOPE(US/MHZ)= 0
RMS ERRORS: LOSS(DB)= .1442322 PHASE(DEG)= 1121.45
PLOT SCALES: LOSS 10 DB/DIV LOSS 1 DB/DIV VS. FREQ 10 MHZ/DIV



PEAK: LEVEL(DB)= 29.68263 FREQ(MHZ)= 383.3925 DELAY(US)=-.4072914 SIDELOBE(DB)=-41.9442
ENERGY: LEVEL(DB)= 29.20517 CENTER(MHZ)= 370.2081 WIDTH(MHZ)= 36.9422 SKEW(MHZ)=-.2191352

L(DB)	LO(MHZ)	HI(MHZ)	CTR(MHZ)	WID(MHZ)	AV-CTR(MHZ)	AV-WID(MHZ)	AV-SL(DB)	LOX(MHZ)	HIX(MHZ)
-0.35	383.39249	383.39249	383.39249	0.00000	383.39249	0.00000	0.00	383.39249	383.39249
0.50	353.59240	385.91434	369.79837	32.32193	369.94985	32.37354	-13.33	353.58240	385.91434
1.00	353.32175	386.39737	369.85956	33.07562	369.94931	33.03672	-14.30	353.32175	386.39737
2.00	352.80624	387.23889	370.02258	34.43265	370.09952	33.89098	-16.02	352.80624	387.23889
3.00	352.40552	387.73959	370.07269	35.33377	370.10275	34.35554	-17.40	352.40582	387.73959
4.00	352.08495	388.19702	370.14099	36.11205	370.11165	34.72533	-18.99	352.08495	388.19702
5.00	351.80554	388.55264	370.17908	36.74710	370.19409	34.98430	-19.88	351.80554	388.55264
6.00	351.55737	388.83102	370.19421	37.27365	370.19217	35. 3235	-21.91	351.55737	388.83102
10.00	350.83023	389.68750	370.25891	38.85721	370.19632	35. 1441	-26.95	350.83023	389.68750
20.00	349.61584	391.11490	370.35536	41.49905	370.20825	35. 3067	-38.71	349.61584	391.11490
30.00	348.63181	392.02261	370.32721	43.39081	370.20804	35. 3724	-46.20	348.63181	392.02261
40.00	347.94037	392.62531	370.28284	44.68494	370.20792	35. 3793	-49.48	347.94037	392.62531

BAND(MHZ)	356.700	383.700
LMIN(DB)	-0.35	
LMAX(DB)	0.26	
LDEL(DB)	0.52	
PMIN(DEG)	-1932.79	
PMAX(DEG)	1926.40	
PDEL(DEG)	3859.19	

File: 1CR83B5A.DAT Passband Symmetry = 0.2 dB

PHONON CORPORATION

FILE=:ER8805A.DAT 13:27:28 04-13-1998

PN_100823_823 FINAL_FUNCTIONAL TEMP:R FLIGHT5_3FUNCT /N WIDE_S21

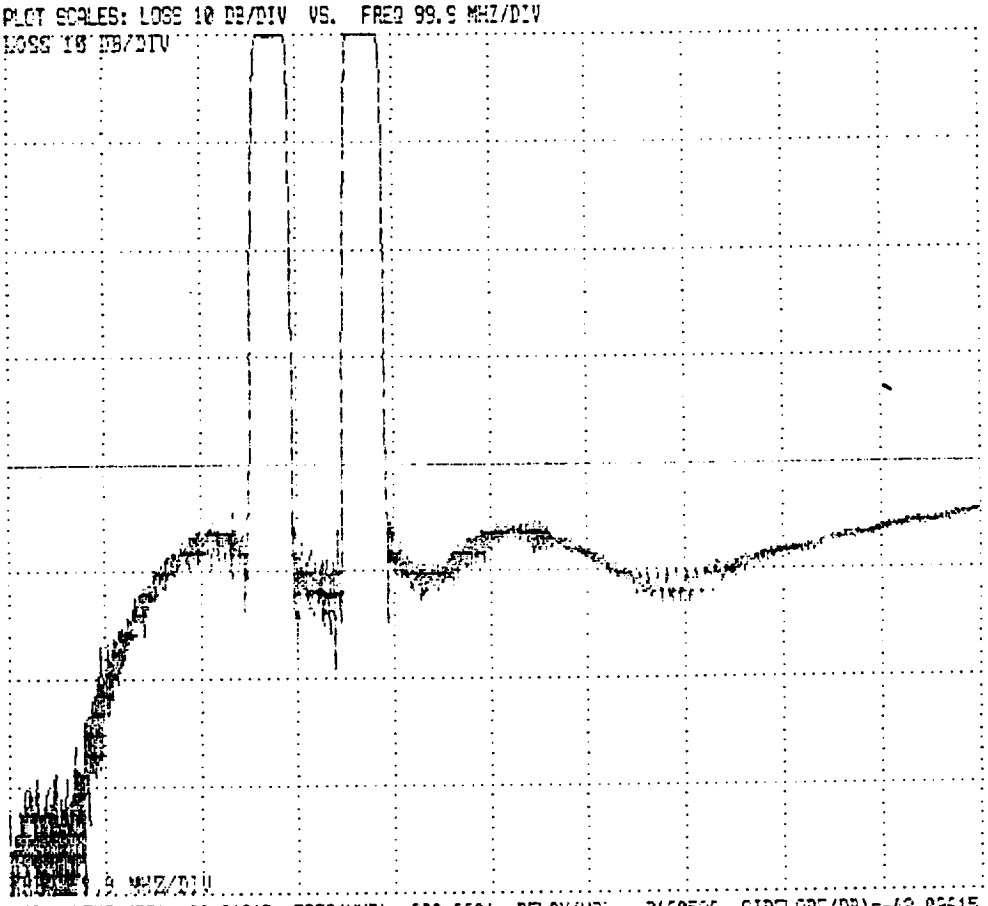
04-13-1998 HP8753,SSREF,SSREF

FREQUENCY(MHZ): CENTER= 500.5 WIDTH= 999 INCR.= .2496125 SYSTEM BANDWIDTH= 999

REFERENCES: LOSS(DB)= 28.98109 PHASE(DEG)=-11228.74 DELAY(US)= 5.392351E-02 SLOPE(US/MHZ)= 0

RMS ERRORS: LOSS(DB)= 16.05305 PHASE(DEG)= 4444.835

PLOT SCALES: LOSS 10 DB/DIV VS. FREQ 99.9 MHZ/DIV



PEAK: LEVEL(DB)= 28.21849 FREQ(MHZ)= 288.8604 DELAY(US)=-.3160586 SIDELOBE(DB)=-42.05515

ENERGY: LEVEL(DB)= 28.98817 CENTER(MHZ)= 323.757 WIDTH(MHZ)= 73.34755 SKEW(MHZ)= 3.792779

L(DB)	LO(MHZ)	HI(MHZ)	CTR(MHZ)	WID(MHZ)	AV-CTR(MHZ)	AV-WID(MHZ)	AV-SL(DB)	LOX(MHZ)	HIX(MHZ)
-0.76	288.86038	288.86038	288.86038	0.00000	288.86038	0.00000	0.00	288.86038	288.86038
0.50	259.35101	290.65564	275.01831	31.30463	275.29358	31.85401	-12.69	259.35101	386.16669
1.00	258.46082	291.09726	274.77905	32.63644	275.10654	32.93206	-13.80	258.46082	386.61105
2.00	257.59445	291.57291	274.58368	33.97845	274.94400	34.12870	-13.92	257.59445	387.37827
3.00	257.04425	291.94299	274.49362	34.89874	274.86220	34.48040	-13.96	257.04425	387.85315
4.00	256.56799	292.24722	274.40759	35.67923	274.83246	34.95018	-14.01	256.56799	388.29147
5.00	256.20685	292.49850	274.35266	36.29165	274.83097	35.09782	-14.02	255.20685	388.63170
6.00	255.89905	292.72250	274.31079	36.82346	274.79840	35.27587	-14.04	255.89905	388.90323
10.00	255.00818	293.49856	274.24835	38.48038	274.79535	35.55450	-14.07	255.00818	389.73453
20.00	253.49542	294.81551	274.15552	41.32019	274.78745	35.67092	-14.07	253.49542	391.14212
30.00	252.59691	295.61406	274.20547	43.21715	274.78717	35.67987	-14.06	252.59691	392.05392
40.00	251.82321	295.79794	274.31058	44.97473	274.78732	35.69050	-14.05	251.82321	392.64099

BAND(MHZ)	1.000	225.000	420.000	1000.000
LMIN(DB)	45.57	-0.76	44.45	
LMAX(DB)	102.01	59.09	53.01	
LDEL(DB)	56.44	59.85	8.56	
PMIN(DEG)	4174.57	-3911.71	-3289.88	
PMAX(DEG)	7250.11	7725.18	7875.43	
PDEL(DEG)	3075.54	11516.89	11165.31	

FILE: 1ER8805A.DAT Out-of-band Rejection: PEAK= 44.4 dB WIDTH= 0.000 MHz

PHONON CORPORATION

FILE=1FRSB05A.DAT 13:27:49 04-13-1998

PN_102938_823 FINAL_FUNCTIONAL TEMP:R FLIGHT5_3FUNCT /N DUAL_SXX

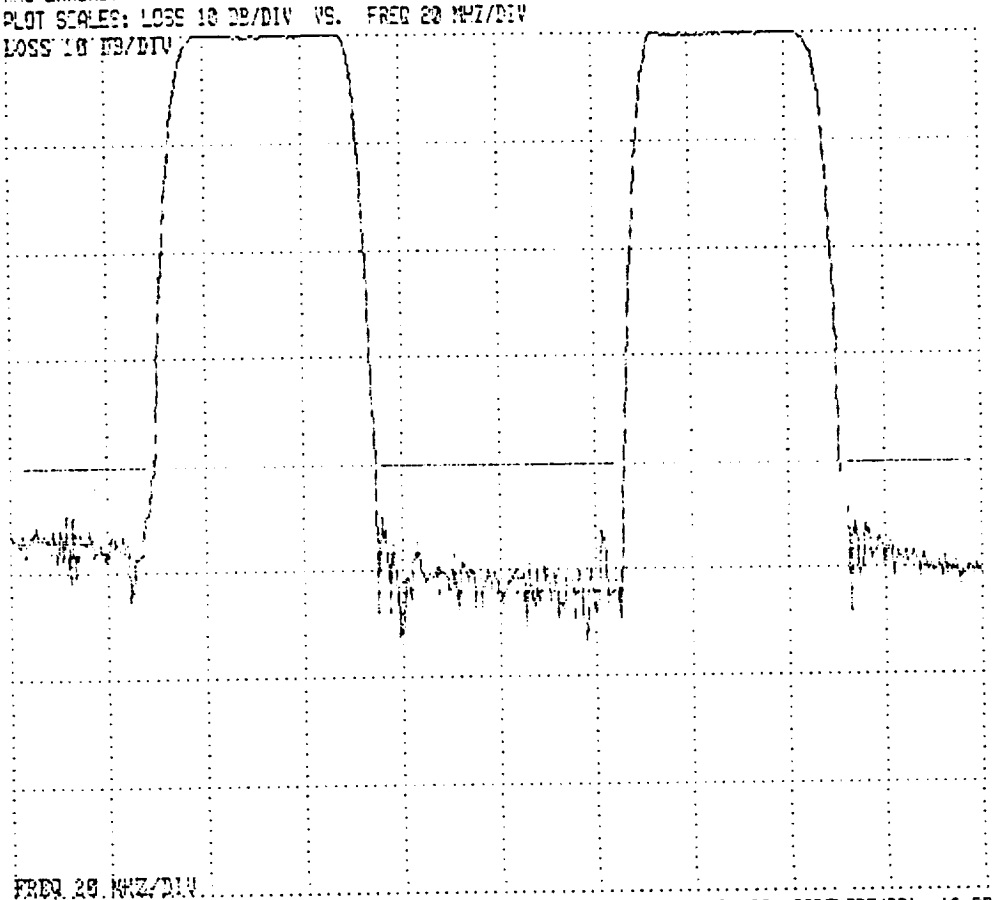
04-13-1998 HP8753,SSREF,SSREF

FREQUENCY(MHZ): CENTER= 322.2 WIDTH= 200 INCR.= .4 SYSTEM BANDWIDTH= 200

REFERENCES: LOSS(DB)= 28.92129 PHASE(DEG)=-59159.88 DELAY(US)= .2255444 SLOPE(US/MHZ)= 0

RMS ERRORS: LOSS(DB)= 23.55954 PHASE(DEG)= 933.6125

PLOT SCALES: LOSS 10 DB/DIV VS. FREQ 20 MHZ/DIV



PEAK: LEVEL(DB)= 28.23359 FREQ(MHZ)= 258.8974 DELAY(US)= 3.0540585E-02 SIDELOBE(DB)=-42.39324

ENERGY: LEVEL(DB)= 29.13553 CENTER(MHZ)= 322.0926 WIDTH(MHZ)= 73.33222 SKEW(MHZ)= .8058931

L(DB)	LO(MHZ)	HI(MHZ)	CTR(MHZ)	WID(MHZ)	AV-CTR(MHZ)	AV-WID(MHZ)	AV-SL(DB)	LOX(MHZ)	HIX(MHZ)
-0.75	288.89737	288.89737	288.89737	0.00000	288.89737	0.00000	0.00	288.89737	288.89737
0.50	259.37164	290.68268	275.02716	31.31104	275.29352	32.19745	-5.42	259.37164	385.85794
1.00	258.44901	291.08481	274.76691	32.63580	275.11258	33.20114	-6.50	258.44901	386.34662
2.00	257.60449	291.56314	274.58380	33.95865	274.95718	34.05237	-6.56	257.60449	387.20627
3.00	257.04160	291.93957	274.49063	34.89807	274.94574	34.50577	-6.59	257.04160	387.71341
4.00	256.57065	292.24060	274.40564	35.66995	274.84140	35.02995	-6.64	256.57065	388.17456
5.00	256.20395	292.49176	274.34784	36.28781	274.84140	35.02995	-6.62	256.20395	388.53482
6.00	255.89656	292.71881	274.30758	36.82225	274.83240	35.27057	-6.64	255.89656	388.81583
10.00	255.00406	293.48650	274.24533	38.48254	274.80942	35.54494	-6.62	255.00406	389.67743
20.00	253.49055	294.80936	274.14996	41.31980	274.78556	35.67377	-6.56	253.49055	391.10812
30.00	252.59509	295.81131	274.20319	43.21622	274.78585	35.68284	-6.51	252.59509	392.01880
40.00	251.82648	296.81616	274.32233	44.98769	274.78595	35.68324	-6.46	251.82648	392.62015

BAND(MHZ)	260.700	287.700	356.700	383.700
LMIN(DB)	-0.54	-0.74	-0.30	
LMAX(DB)	0.28	56.61	0.32	
LDEL(DB)	0.83	57.35	0.62	
PMIN(DEG)	-1063.86	-1924.38	-528.51	
PMAX(DEG)	793.10	1858.99	1187.01	
PDEL(DEG)	1856.96	3783.37	1715.52	

FILE: 1FR3325A.DAT Out-of-band Rejection: PEAK= 44.4 dB WIDTH= 0.000 MHz

PHONON CORPORATION
FILE: 1FR8B05A.DAT (+SSCF)
PN_100828_623 FINAL_FUNCTIONAL TEMP:R FLIGHTS_3FUNCT /N DUAL_5XX
04-13-1998 HP8753,SSREF,SSREF,SSCF
REFERENCES: LOSS(DB)= 28.98109 PHASE(DEG)= -59158.88
DELAY(US)= .2255444 SLOPE(US/MHZ)= 0

BANDPASS CHARACTERISTICS MEASUREMENT

FREQUENCY(MHZ)	LOSS(DB)	PHASE(DEG)
248.600	47.15	550.95
248.752	49.02	1307.43
256.920	3.24	1071.19
265.080	-0.05	505.34
273.240	0.11	-70.51
281.402	0.07	-645.42
289.560	-0.50	-1213.39
297.722	48.92	-1903.11
305.880	49.81	-1057.53
314.040	51.76	-700.40
322.200	50.95	-69.80
330.360	53.12	575.05
338.522	50.83	1242.09
346.680	51.75	1850.99
354.840	-3.06	1231.31
363.000	0.29	630.24
371.160	-0.02	257.17
379.322	-0.15	-351.72
387.480	0.49	-779.15
395.640	45.91	-1240.01
403.802	49.24	-405.79

ELECTRICAL TEST DATA SHEET

AEROJET PART: 1331576-1 PHONON PART: 100823 SERIAL: B05

TESTED BY: 210 TITLE: Test Tech DATE: 4/13/98 TIME: 3:30pm

TEST: FINAL FUNCTIONAL

EQUIPMENT: HP 8753D SERIAL: 3410A04374 CAL DUE: 1/29/99

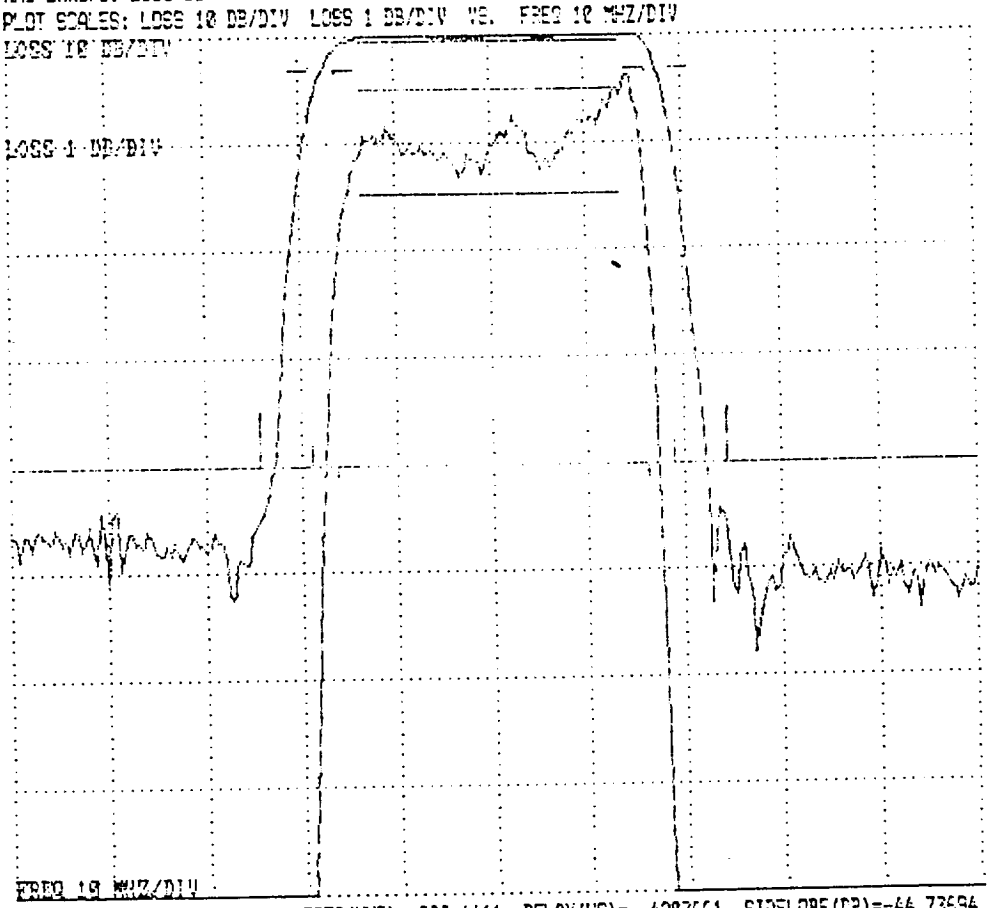
HP 3478A SERIAL: 2136A03127 CAL DUE: 7/7/98

PARAGRAPH REQ.	PARAGRAPH Q/ATP	REQUIREMENT TITLE	DATA		P/F
3.2.1.1	5.2.1	OPERATING TEMPERATURE	35.4	C	P
3.2.1.3	5.2.3	CENTER FREQUENCY &			
3.2.1.4		CENTER FREQUENCY STABILITY			
		LO: 273.335/275.065 MHz	274.081	MHz	P
		HI: 369.335/371.065 MHz	369.489	MHz	P
3.2.1.5	5.2.4	3 dB BANDWIDTH:			
		LO: 34/36 MHz	34.800	MHz	P
		HI: 34/36 MHz	35.295	MHz	P
3.2.1.6	5.2.5	PASSBAND SYMMETRY			
		LO: /0.5 dB	0.3	dB	P
		HI: /0.5 dB	0.1	dB	P
3.2.1.7	5.2.6	PASSBAND RIPPLE			
		260.7-287.7 MHz: /1.0 dB	0.7	dB	P
		356.7-383.7 MHz: /1.0 dB	0.4	dB	P
3.2.1.8	5.2.7	INSERTION LOSS			
		LO: 27.8/30.2 dB	29.2	dB	P
		HI: 27.8/30.2 dB	29.0	dB	P
3.2.1.9	5.2.8	INSERTION LOSS VARIATION			
		LO: -0.4/0.4 dB	0.2	dB	P
		HI: -0.4/0.4 dB	-0.0	dB	P
3.2.1.10	5.2.9	AMPLITUDE BALANCE			
		LO,HI: /0.5 dB	0.1	dB	P
3.2.1.11	5.2.10	OUT-OF-BAND REJECTION			
		BAND	PEAK(dB)	WIDTH(MHz)	
		WIDE: 1-225,420-1000 MHz:	45.3	0.000	
		DUAL: 225.000-249.935, 298.465-345.935, 394.465-420.00 MHz:	44.2	0.000	
		PEAK: 35.0/ dB	44.2	dB	P
		WIDTH: /7.2 MHz		0.000 MHz	P
3.2.1.12	5.2.11	SHAPE FACTOR			
		LO: /1.30 Unitless	1.29	Unitless	P
		HI: /1.30 Unitless	1.27	Unitless	P
3.2.1.14	5.2.12	VSWR (RETURN LOSS)			
		260.7-287.7,356.7-383.7 MHz			
		DUAL S11: 7.5/ dB	11.7	dB	P
		DUAL S22: 7.5/ dB	8.7	dB	P
4.8.2	5.2.14	LIMITED FUNCTIONAL TESTS			
		CENTER FREQUENCY: -0.2/0.2 MHz	0	MHz	P
		3 dB BANDWIDTH: -0.72/0.72 MHz	0	MHz	P
		INSERTION LOSS: -0.5/0.5 dB	0	dB	P
NONE	5.2.15	DATA SHEET SUMMARY (PASS/FAIL)	P (QP)		

PHONON CORPORATION
7 HERMAN DRIVE
SIMSBURY, CT 06070

CAGE: 6Y858
TEL: 203-651-0211
FAX: 203-651-8618

PHONON CORPORATION
FILE=1A488B05A.DAT 13:38:51 04-13-1998
PN_100628_B03 FINAL_FUNCTIONAL TEMP:H FLIGHTS_3FUNCT_IN DUAL_8XX
04-13-1998 HP8753,SSCF,SSFFIX,SSREF
FREQUENCY(MHZ): CENTER= 274.2 WIDTH= 100 INCR.= .4 SYSTEM BANDWIDTH= 27
REFERENCES: LOSS(DB)= 29.15339 PHASE(DEG)=-5531.05 DELAY(US)= 0 SLOPE(US/MHZ)= 0
RMS ERRORS: LOSS(DB)= .1811072 PHASE(DEG)= 1175.333
PLOT SCALES: LOSS 10 DB/DIV LOSS 1 DB/DIV VS. FREQ 10 MHZ/DIV



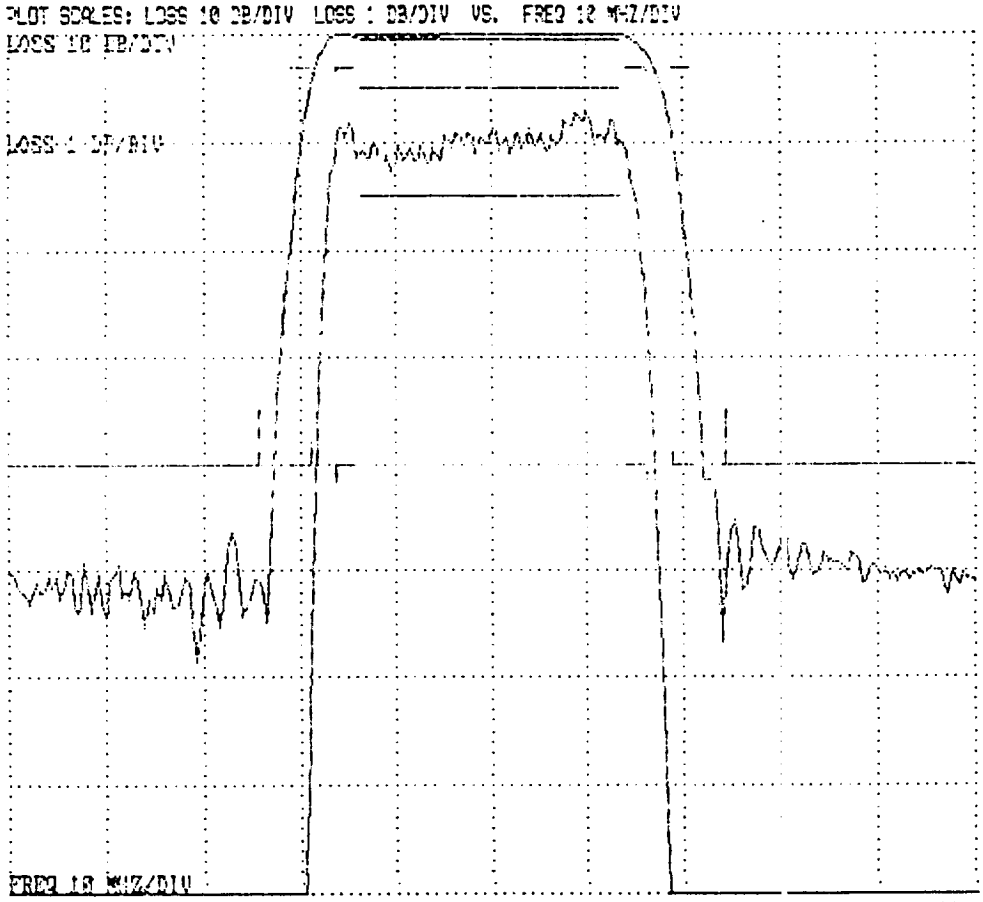
PEAK: LEVEL(DB)= 28.52031 FREQ(MHZ)= 288.4411 DELAY(US)=-.4203561 SIDELOBE(DB)=-44.73694
ENERGY: LEVEL(DB)= 29.31934 CENTER(MHZ)= 274.3435 WIDTH(MHZ)= 36.37354 SKEW(MHZ)=-.4427097

L(DB)	LO(MHZ)	HI(MHZ)	CTR(MHZ)	WID(MHZ)	AV-CTR(MHZ)	AV-WID(MHZ)	AV-SL(DB)	LOX(MHZ)	HIX(MHZ)
-0.64	288.44113	288.44113	288.44113	0.00000	288.44113	0.00000	0.00	288.44113	288.44113
0.50	259.17235	290.18050	274.67648	31.00824	274.95511	30.99728	-12.28	259.17235	290.18050
1.00	258.13445	290.50620	274.27033	32.47174	274.67905	32.57726	-14.50	258.13445	290.50620
2.00	257.24785	291.10052	274.17419	33.85266	274.52185	33.50965	-16.24	257.24785	291.10052
3.00	256.68091	291.48090	274.08090	34.79999	274.50964	33.95074	-17.60	256.68091	291.48090
4.00	256.19919	291.78973	273.99445	35.59055	274.32265	34.30339	-19.15	256.19919	291.78973
5.00	255.83603	292.03650	273.93628	36.20047	274.40274	34.46128	-20.09	255.83603	292.03650
6.00	255.52339	292.26886	273.89612	36.74547	274.39212	34.69342	-22.06	255.52339	292.26886
10.00	254.62758	293.03659	273.83209	38.40901	274.35731	34.95694	-25.69	254.62758	293.03659
20.00	253.10648	294.35911	273.73779	41.25263	274.34389	35.07993	-37.79	253.10648	294.35911
30.00	252.20708	295.37708	273.79208	43.17000	274.34290	35.08775	-44.54	252.20708	295.37708
40.00	251.42221	296.38165	273.90192	44.95944	274.34299	35.08885	-47.89	251.42221	296.38165

BAND(MHZ)	260.700	287.700
LMIN(DB)	-0.50	
LMAX(DB)	0.34	
LDEL(DB)	0.84	
PMIN(DEG)	-2000.92	
PMAX(DEG)	2005.04	
PDEL(DEG)	4005.96	

File: 1A488B05A.DAT Passband Symmetry = 0.3 dB

PHONON CORPORATION
FILE=1CH8805A.DAT 13:39:33 04-13-1998
PN_100928_823 FINAL_FUNCTIONAL TEMP:H FLIGHT5_3FUNCT /N DUAL_5XX
04-12-1998 HP8752,SSDF,SSFFIX,SSREF
FREQUENCY(MHZ): CENTER= 370.2 WIDTH= 100 INCR.= .4 SYSTEM BANDWIDTH= 27
REFERENCES: LOSS(DB)= 99.03662 PHASE(DEG)=-63953.16 DELAY(US)= 0 SLOPE(US/MHZ)= 0
RMS ERRORS: LOSS(DB)= .1269537 PHASE(DEG)= 1132.22
PLOT SCALES: LOSS 10 DB/DIV LOSS 1 DB/DIV VS. FREQ 12 MHZ/DIV



PEAK: LEVEL(DB)= 28.73965 FREQ(MHZ)= 379.1149 DELAY(US)=-.4137408 SIDE LOBE(DB)=-45.51641
ENERGY: LEVEL(DB)= 29.21636 CENTER(MHZ)= 369.5858 WIDTH(MHZ)= 36.90345 SKEW(MHZ)=-.1420821

L(DB)	LO(MHZ)	HI(MHZ)	CTR(MHZ)	WID(MHZ)	AV-CTR(MHZ)	AV-WID(MHZ)	AV-SL(DB)	LOX(MHZ)	HIX(MHZ)
-0.30	379.11487	379.11487	379.11487	0.00003	379.11487	0.00000	0.00	379.11487	379.11487
0.50	353.10235	385.20969	369.15601	32.10733	369.30358	31.03697	-12.94	353.10236	385.20969
1.00	352.78726	385.73132	369.25928	32.94405	369.32197	32.03180	-13.85	352.78726	385.73132
2.00	352.25516	386.63873	369.44596	34.38359	369.58253	33.78073	-16.09	352.25516	386.63873
3.00	351.84167	387.13681	369.48926	35.29514	369.56760	34.24002	-17.48	351.84167	387.13681
4.00	351.53937	387.59406	369.56671	36.05469	369.55629	34.61129	-19.09	351.53937	387.59406
5.00	351.25729	387.94791	369.60250	36.69051	369.55771	34.93521	-20.33	351.25729	387.94791
6.00	351.01047	388.25217	369.63132	37.24170	369.51362	35.23826	-21.94	351.01047	388.25217
10.00	350.28293	389.10919	369.69604	38.82626	369.59189	35.28210	-27.02	350.28293	389.10919
20.00	349.07455	390.54169	369.80811	41.46713	369.58539	35.29221	-36.97	349.07455	390.54169
30.00	348.09262	391.46045	369.77655	42.36783	369.58560	35.30313	-47.86	348.09262	391.46045
40.00	347.39569	392.10495	369.75031	44.70926	369.58554	35.30345	-49.62	347.39569	392.10495

BAND(MHZ) 355.702 383.700
LMIN(DB) -0.29
LMAX(DB) 0.26
LDEL(DB) 0.55
PMIN(DEG) -1934.13
PMAX(DEG) 1929.32
PDEL(DEG) 3863.45
File: 1CH8805A.DAT Passband Symmetry = 0.1 dB

Channel 12 Bandpass Filter

SAW Filter (S/N: 1331576-2, S/N: B05)

ELECTRICAL TEST DATA SHEET

AEROJET PART: 1331576-2 PHONON PART: 100824 SERIAL: B05
TESTED BY: 210 TITLE: Test Tech DATE: 4/13/99 TIME: 5:30pm
TEST: FINAL FUNCTIONAL
EQUIPMENT: HP 8753D SERIAL: 3410A04374 CAL DUE: 1/29/99
HP 3478A SERIAL: 2136A03127 CAL DUE: 7/7/98

PARAGRAPH REQ.	Q/ATP	REQUIREMENT TITLE	DATA		P/F
3.2.1.1	5.2.1	OPERATING TEMPERATURE	-5.1	C	P
3.2.1.3	5.2.3	CENTER FREQUENCY &			
3.2.1.4		CENTER FREQUENCY STABILITY			
		LO: 299.335/301.065 MHz	300.366	MHz	P
		HI: 343.335/345.065 MHz	344.240	MHz	P
3.2.1.5	5.2.4	3 dB BANDWIDTH:			
		LO: 15/16 MHz	15.434	MHz	P
		HI: 15/16 MHz	15.481	MHz	P
3.2.1.6	5.2.5	PASSBAND SYMMETRY			
		LO: /0.5 dB	0.1	dB	P
		HI: /0.5 dB	0.3	dB	P
3.2.1.7	5.2.6	PASSBAND RIPPLE			
		294.2-306.2 MHz: /1.0 dB	0.4	dB	P
		338.2-350.2 MHz: /1.0 dB	0.6	dB	P
3.2.1.8	5.2.7	INSERTION LOSS			
		LO: 27.8/30.2 dB	28.8	dB	P
		HI: 27.8/30.2 dB	29.2	dB	P
3.2.1.9	5.2.8	INSERTION LOSS VARIATION			
		LO: -0.4/0.4 dB	-0.2	dB	P
		HI: -0.4/0.4 dB	0.1	dB	P
3.2.1.10	5.2.9	AMPLITUDE BALANCE			
		LO,HI: /0.5 dB	0.4	dB	P
3.2.1.11	5.2.10	OUT-OF-BAND REJECTION			
		BAND	PEAK(dB)	WIDTH(MHz)	
		WIDE: 1-286,359-1000 MHz:	44.6	0.000	
		DUAL: 286.000-288.935,			
		311.465-332.935,			
		355.465-359.00 MHz:	45.4	0.000	
		PEAK: 35.0/ dB	44.6	dB	P
		WIDTH: /3.2 MHz		0.000 MHz	P
3.2.1.12	5.2.11	SHAPE FACTOR			
		LO: /1.30 Unitless	1.28	Unitless	P
		HI: /1.30 Unitless	1.30	Unitless	P
3.2.1.14	5.2.12	VSWR (RETURN LOSS)			
		294.2-306.2,338.2-350.2 MHz			
		DUAL S11: 7.5/ dB	14.4	dB	P
		DUAL S22: 7.5/ dB	8.6	dB	P
4.8.2	5.2.14	LIMITED FUNCTIONAL TESTS			
		CENTER FREQUENCY: -0.2/0.2 MHz	0	MHz	P
		3 dB BANDWIDTH: -0.32/0.32 MHz	0	MHz	P
		INSERTION LOSS: -0.5/0.5 dB	0	dB	P
NONE	5.2.15	DATA SHEET SUMMARY (PASS/FAIL)	P	(P)	

PHONON CORPORATION
7 HERMAN DRIVE
SIMSBURY, CT 06070

CAGE: 6Y858
TEL: 203-651-0211
FAX: 203-651-8618

PHONON CORPORATION

FILE=2AC8B05A.DAT 13:16:41 04-13-1998

PN_100830_824 FINAL_FUNCTIONAL TEMP:C FLIGHTS_3FUNCT /N DUAL_SXX

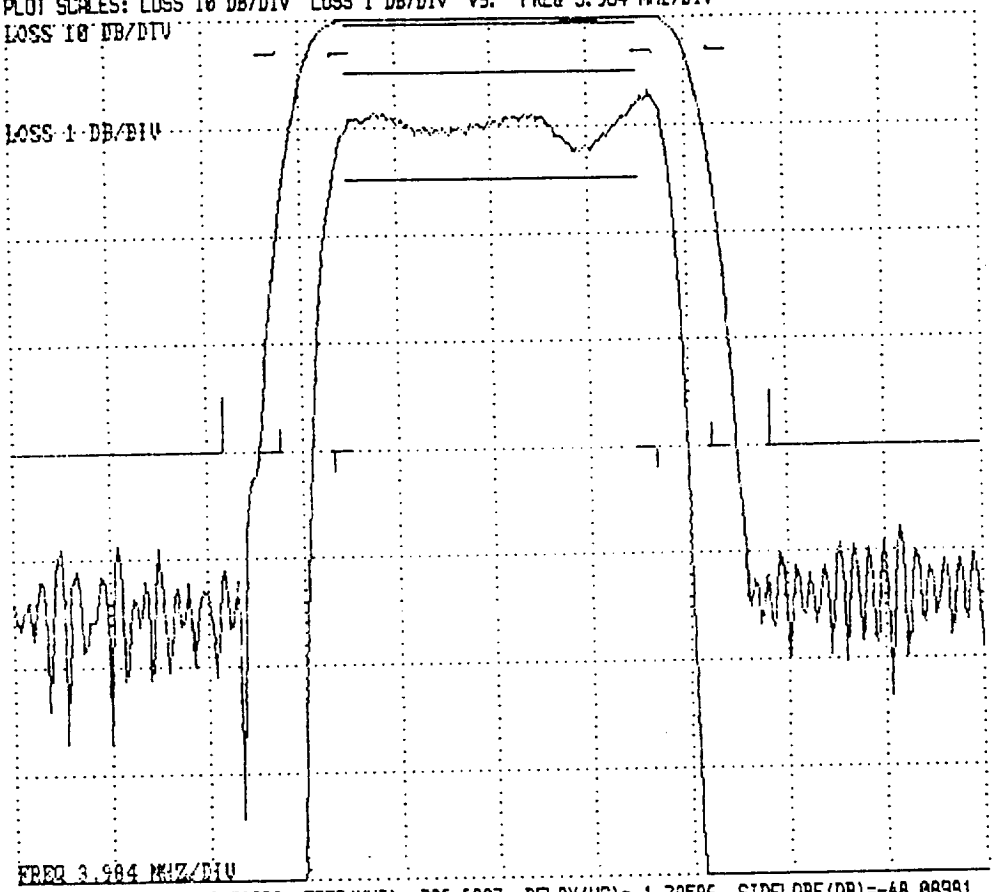
04-13-1998 HP8753,SSCF,SSFFIX,SSREF

FREQUENCY(MHZ): CENTER= 300.2 WIDTH= 39.84 INCR.= .12 SYSTEM BANDWIDTH= 12

REFERENCES: LOSS(DB)= 28.82559 PHASE(DEG)= 946.9928 DELAY(US)= 0 SLOPE(US/MHZ)= 0

RMS ERRORS: LOSS(DB)= 9.821784E-02 PHASE(DEG)= 1736.747

PLOT SCALES: LOSS 10 DB/DIV LOSS 1 DB/DIV VS. FREQ 3.984 MHZ/DIV



PEAK: LEVEL(DB)= 28.50838 FREQ(MHZ)= 306.5807 DELAY(US)=-1.38586 SIDELOBE(DB)=-48.08991

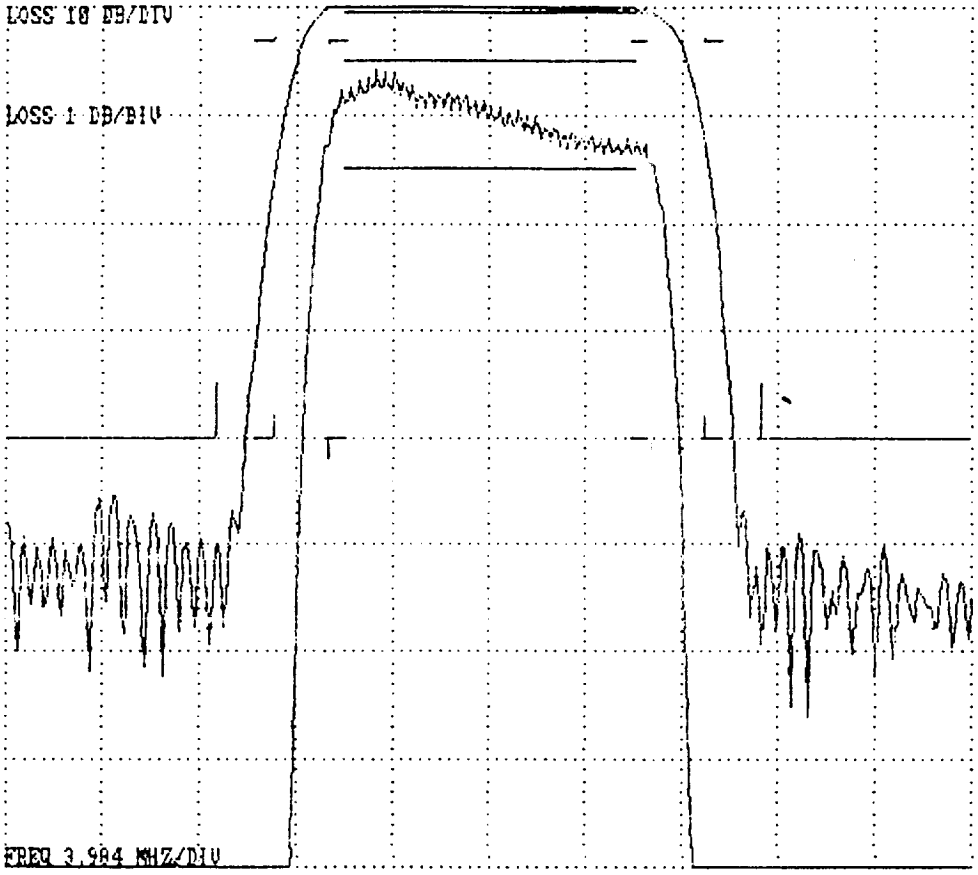
ENERGY: LEVEL(DB)= 28.99986 CENTER(MHZ)= 300.3886 WIDTH(MHZ)= 16.14475 SKEW(MHZ)=-4.978938E-03

L(DB)	LO(MHZ)	HI(MHZ)	CTR(MHZ)	WID(MHZ)	AV-CTR(MHZ)	AV-WID(MHZ)	AV-SL(DB)	LOX(MHZ)	HIX(MHZ)
-0.32	306.68073	306.68073	306.68073	0.00000	306.68073	0.00000	0.00	306.68073	306.68073
0.50	293.53091	307.45563	300.49329	13.92471	300.50723	13.92800	-12.16	293.53091	307.45563
1.00	293.19785	307.63919	300.41852	14.44135	300.40640	14.23460	-13.37	293.19785	307.63919
2.00	292.85989	307.88928	300.37457	15.02939	300.40784	14.84683	-15.75	292.85989	307.88928
3.00	292.64944	308.08295	300.36621	15.43350	300.40671	14.98177	-16.67	292.64944	308.08295
4.00	292.47736	308.23892	300.35815	15.76157	300.37881	15.14949	-18.27	292.47736	308.23892
5.00	292.33411	308.37012	300.35211	16.03601	300.40140	15.27832	-20.14	292.33411	308.37012
6.00	292.21326	308.48285	300.34805	16.26959	300.39917	15.34303	-21.53	292.21326	308.48285
10.00	291.83713	308.84457	300.34085	17.00745	300.39343	15.45746	-26.43	291.83713	308.84457
20.00	291.23535	309.43179	300.33356	18.19644	300.38855	15.50498	-36.61	291.23535	309.43179
30.00	290.77939	309.85260	300.31598	19.07321	300.38867	15.50938	-47.74	290.77939	309.85260
40.00	290.41724	310.10620	300.26172	19.68896	300.38864	15.50961	-52.25	290.41724	310.10620

BAND(MHZ)	294.200	306.200
LMIN(DB)	-0.22	
LMAX(DB)	0.24	
LDEL(DB)	0.46	
PMIN(DEG)	-2976.09	
PMAX(DEG)	2981.65	
PDEL(DEG)	5957.73	

File: 2AC8B05A.DAT Passband Symmetry = 0.1 dB

PHONON CORPORATION
FILE=2CC8305A.DAT 13:17:26 04-13-1998
PN_100830_824 FINAL_FUNCTIONAL TEMP:C FLIGHT5_3FUNCT /N DUAL_SXX
04-13-1998 HP8753,SSCF,SSFFIX,SSREF
FREQUENCY(MHZ): CENTER= 344.2 WIDTH= 39.84 INCR.= .12 SYSTEM BANDWIDTH= 12
REFERENCES: LOSS(DB)= 29.2173 PHASE(DEG)=-11174.73 DELAY(US)= 0 SLOPE(US/MHZ)= 0
RMS ERRORS: LOSS(DB)= .2119674 PHASE(DEG)= 1714.558
PLOT SCALES: LOSS 10 DB/DIV LOSS 1 DB/DIV VS. FREQ 3.984 MHZ/DIV



PEAK: LEVEL(DB)= 28.80031 FREQ(MHZ)= 339.5227 DELAY(US)=-1.373723 SIDELOBE(DB)=-45.85732
ENERGY: LEVEL(DB)= 29.42651 CENTER(MHZ)= 344.0816 WIDTH(MHZ)= 16.21795 SKEW(MHZ)= .291468

L(DB)	LO(MHZ)	HI(MHZ)	CTR(MHZ)	WID(MHZ)	AV-CTR(MHZ)	AV-WID(MHZ)	AV-SL(DB)	LOX(MHZ)	HIX(MHZ)
-0.42	339.52271	339.52271	339.52271	0.00000	339.52271	0.00000	0.00	339.52271	339.52271
0.50	337.24939	350.96283	344.10611	13.71344	343.97470	13.62752	-11.57	337.24939	350.96283
1.00	337.02850	351.35349	344.19098	14.32498	344.03036	14.13621	-12.89	337.02850	351.35349
2.00	336.72650	351.72247	344.22449	14.99597	344.03696	14.65396	-14.94	336.72650	351.72247
3.00	336.49954	351.98007	344.23981	15.48053	344.04327	14.92585	-16.55	336.49954	351.98007
4.00	336.33749	352.16196	344.24973	15.82446	344.07510	15.08790	-18.18	336.33749	352.16196
5.00	336.19516	352.31522	344.25519	16.12006	344.07547	15.17424	-19.29	336.19516	352.31522
6.00	336.07162	352.44901	344.26031	16.37738	344.07611	15.24532	-20.51	336.07162	352.44901
10.00	335.68201	352.86728	344.27466	17.18527	344.08585	15.39392	-25.72	335.68201	352.86728
20.00	335.04242	353.51904	344.28073	18.47662	344.08145	15.45103	-37.47	335.04242	353.51904
30.00	334.59888	353.91885	344.25885	19.31998	344.08160	15.45437	-46.13	334.59888	353.91885
40.00	334.12180	354.29181	344.20679	20.17001	344.08167	15.45475	-51.95	334.12180	354.29181

BAND(MHZ)	338.200	350.200
LMIN(DB)	-0.42	
LMAX(DB)	0.36	
LDEL(DB)	0.78	
PMIN(DEG)	-2937.10	
PMAX(DEG)	2942.93	
PDEL(DEG)	5880.04	

File: 2CC8B05A.DAT Passband Symmetry = 0.3 dB

ELECTRICAL TEST DATA SHEET

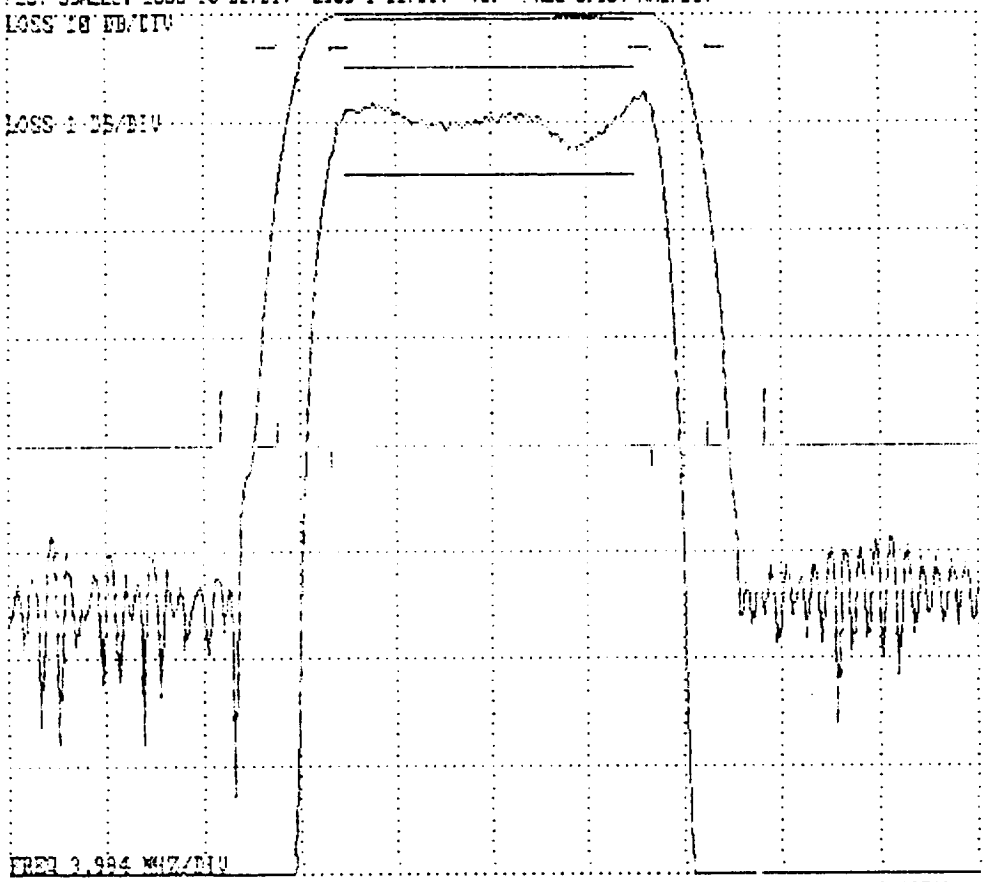
AEROJET PART: 1331576-2 PHONON PART: 100824 SERIAL: B05
TESTED BY: 210 TITLE: Test Tech DATE: 4/13/98 TIME: 2:30pm
TEST: FINAL FUNCTIONAL
EQUIPMENT: HP 8753D SERIAL: 3410A04374 CAL DUE: 1/29/99
HP 3478A SERIAL: 2136A03127 CAL DUE: 7/7/98

PARAGRAPH REQ.	PARAGRAPH Q/ATP	REQUIREMENT TITLE	DATA		P/F
3.2.1.1	5.2.1	OPERATING TEMPERATURE	15.0	C	P
3.2.1.3	5.2.3	CENTER FREQUENCY &			
3.2.1.4		CENTER FREQUENCY STABILITY			
		LO: 299.335/301.065 MHz	300.240	MHz	P
		HI: 343.335/345.065 MHz	344.112	MHz	P
3.2.1.5	5.2.4	3 dB BANDWIDTH:			
		LO: 15/16 MHz	15.426	MHz	P
		HI: 15/16 MHz	15.476	MHz	P
3.2.1.6	5.2.5	PASSBAND SYMMETRY			
		LO: /0.5 dB	0.0	dB	P
		HI: /0.5 dB	0.3	dB	P
3.2.1.7	5.2.6	PASSBAND RIPPLE			
		294.2-306.2 MHz: /1.0 dB	0.4	dB	P
		338.2-350.2 MHz: /1.0 dB	0.6	dB	P
3.2.1.8	5.2.7	INSERTION LOSS			
		LO: 27.8/30.2 dB	29.0	dB	P
		HI: 27.8/30.2 dB	29.2	dB	P
3.2.1.9	5.2.8	INSERTION LOSS VARIATION			
		LO: -0.4/0.4 dB	0.0	dB	P
		HI: -0.4/0.4 dB	0.0	dB	P
3.2.1.10	5.2.9	AMPLITUDE BALANCE			
		LO,HI: /0.5 dB	0.1	dB	P
3.2.1.11	5.2.10	OUT-OF-BAND REJECTION			
		BAND	PEAK(dB)	WIDTH(MHz)	
		WIDE: 1-286,359-1000 MHz:	44.6	0.000	
		DUAL: 286.000-288.935, 311.465-332.935, 355.465-359.00 MHz:	45.8	0.000	
		PEAK: 35.0/ dB	44.6 dB		P
		WIDTH: /3.2 MHz		0.000 MHz	P
3.2.1.12	5.2.11	SHAPE FACTOR			
		LO: /1.30 Unitless	1.28	Unitless	P
		HI: /1.30 Unitless	1.30	Unitless	P
3.2.1.14	5.2.12	VSWR (RETURN LOSS)			
		294.2-306.2,338.2-350.2 MHz			
		DUAL S11: 7.5/ dB	13.6	dB	P
		DUAL S22: 7.5/ dB	8.3	dB	P
4.8.2	5.2.14	LIMITED FUNCTIONAL TESTS			
		CENTER FREQUENCY: -0.2/0.2 MHz	+0.014	MHz	P
		3 dB BANDWIDTH: -0.32/0.32 MHz	+0.006	MHz	P
		INSERTION LOSS: -0.5/0.5 dB	+0.2	dB	P
NONE	5.2.15	DATA SHEET SUMMARY (PASS/FAIL)	P (PP)		

PHONON CORPORATION
7 HERMAN DRIVE
SIMSBURY, CT 06070

CAGE: 6Y858
TEL: 203-651-8211
FAX: 203-651-8618

PHONON CORPORATION
FILE=2AR8B05A.DAT 13:28:56 04-13-1998
PN_102830_824 FINAL_FUNCTIONAL TEMP:R FLIGHTS_3FUNCT /N DUAL_SXX
04-13-1998 HP8753,SSCF,SSFFIX,SSREF
FREQUENCY(MHZ): CENTER= 300.2 WIDTH= 39.54 INCR.= .12 SYSTEM BANDWIDTH= 12
REFERENCES: LOSS(DB)= 29.04255 PHASE(DEG)= 9766.563 DELAY(US)= 0 SLOPE(US/MHZ)= 0
RMS ERRORS: LOSS(DB)= .1070369 PHASE(DEG)= 1727.471
PLOT SCALES: LOSS 10 DB/DIV LOSS 1 DB/DIV VS. FREQ 3.984 MHZ/DIV



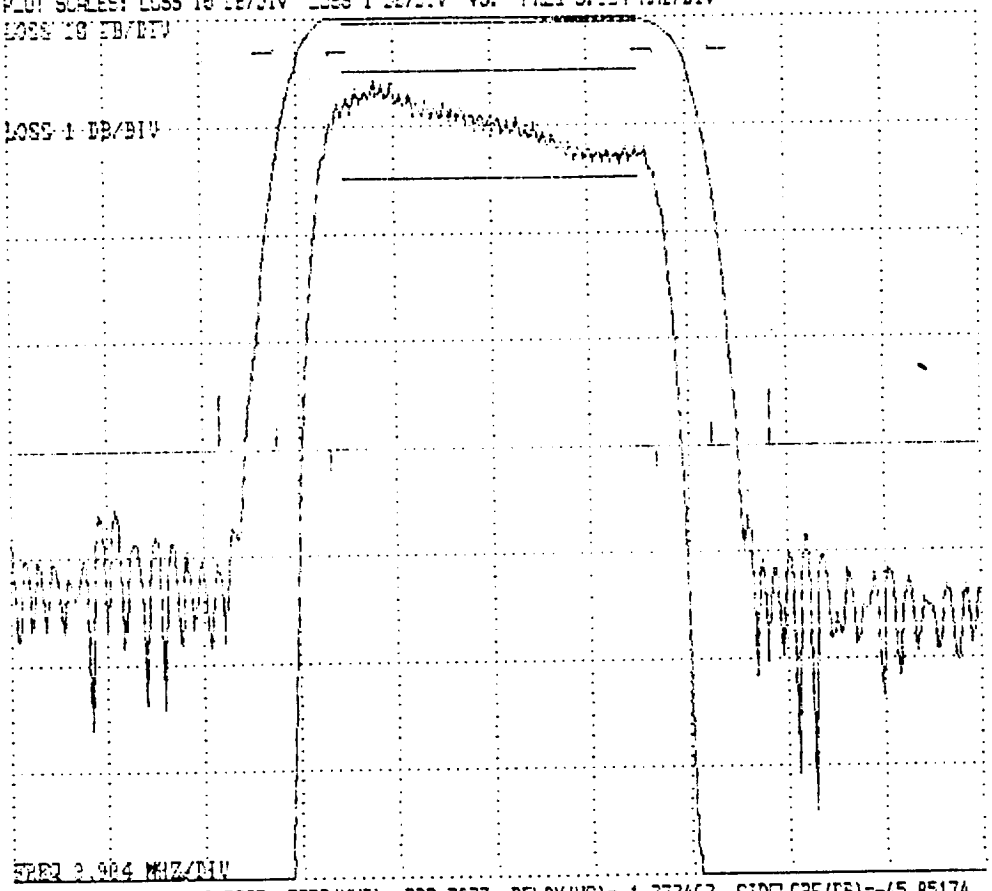
PEAK: LEVEL(DB)= 28.753 FREQ(MHZ)= 306.5505 DELAY(US)=-1.385655 SIDELOBE(DB)=-48.86503
ENERGY: LEVEL(DB)= 29.2192 CENTER(MHZ)= 300.2383 WIDTH(MHZ)= 16.13803 SKEW(MHZ)= 3.517157E-02

L(DB)	LO(MHZ)	HI(MHZ)	CTR(MHZ)	WID(MHZ)	AV-CTR(MHZ)	AV-WID(MHZ)	AV-SL(DB)	LOX(MHZ)	HIX(MHZ)
-0.28	305.55063	305.55063	305.55063	0.00002	305.55063	0.00000	0.00	305.55063	305.55063
0.50	293.38580	307.32083	300.35333	13.93503	300.36108	13.91801	-12.18	293.38580	307.32083
1.00	293.06723	307.50854	300.28790	14.44131	300.25940	14.32562	-13.29	293.06723	307.50854
2.00	292.73544	307.75635	300.24591	15.02090	300.22141	14.76092	-15.31	292.73544	307.75635
3.00	292.52725	307.95325	300.24023	15.42599	300.25827	14.97085	-15.71	292.52725	307.95325
4.00	292.35367	308.10855	300.23111	15.75488	300.23015	15.13805	-18.32	292.35367	308.10855
5.00	292.21271	308.24105	300.22687	16.02835	300.25220	15.26556	-20.19	292.21271	308.24105
6.02	292.09201	308.35306	300.22253	16.26105	300.23395	15.30001	-20.85	292.09201	308.35306
10.00	291.71729	308.71518	300.21625	16.99789	300.23780	15.43109	-25.59	291.71729	308.71518
20.00	291.11499	309.30231	300.20965	18.18732	300.23828	15.48981	-36.73	291.11499	309.30231
30.00	290.65424	309.72092	300.18756	19.06668	300.23837	15.49410	-48.04	290.65424	309.72092
40.00	290.29357	309.97351	300.13361	19.67984	300.23834	15.49432	-52.88	290.29357	309.97351

BAND(MHZ)	294.200	306.200
LMIN(DB)	-0.28	
LMAX(DB)	0.26	
LDEL(DB)	0.49	
PMIN(DEG)	-2977.67	
PMAX(DEG)	2982.54	
PDEL(DEG)	5960.31	

File: 2AR8B05A.DAT Passband Symmetry = 0.0 dB

PHONON CORPORATION
FILE=2CR5B05A.DAT 13:29:48 04-13-1998
PN 100830-924 FINAL_FUNCTIONAL TEMP:R FLIGHT5_3FUNCT /N DUAL_SXX
04-13-1998 HP8753,SSCF,SSFFIX,SSREF
FREQUENCY(MHZ): CENTER= 344.2 WIDTH= 39.84 INCR.= .12 SYSTEM BANDWIDTH= 12
REFERENCES: LOSS(DB)= 29.16346 PHASE(DEG)=-2881.612 DELAY(NS)= 0 SLOPE(NS/MHZ)= 0
RMS ERRORS: LOSS(DB)= .2147316 PHASE(DEG)= 1715.385
PLOT SCALES: LOSS 10 DB/DIV LOSS 1 DB/DIV VS. FREQ 3.984 MHZ/DIV



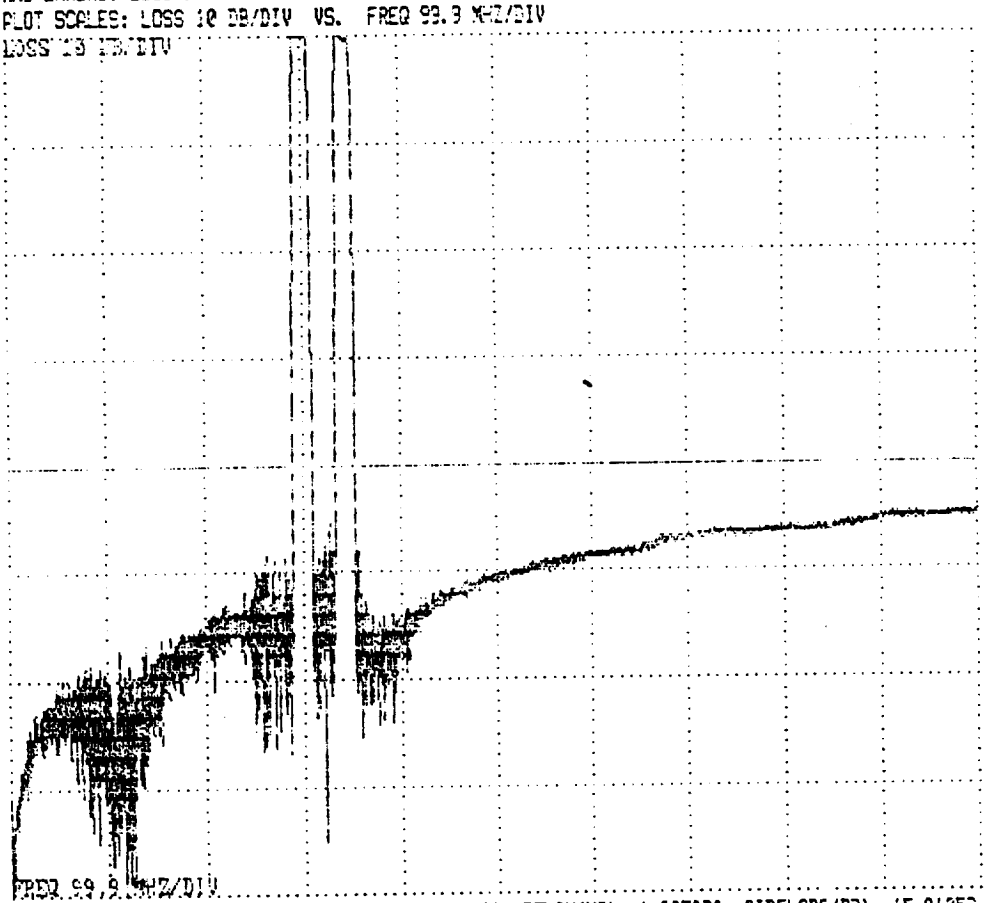
PEAK: LEVEL(DB)= 28.7367 FREQ(MHZ)= 339.3837 DELAY(NS)=-1.373463 SIDELOBE(DB)=-45.85174
ENERGY: LEVEL(DB)= 29.39752 CENTER(MHZ)= 343.9561 WIDTH(MHZ)= 16.21052 SKEW(MHZ)= .2872382

L(DB)	LO(MHZ)	HI(MHZ)	CTR(MHZ)	WID(MHZ)	AV-CTR(MHZ)	AV-WID(MHZ)	AV-SL(DB)	LOX(MHZ)	HIX(MHZ)
-0.43	329.38367	329.38367	329.38367	0.00000	339.38367	0.00000	0.00	329.38367	339.38367
0.50	337.11844	350.84967	343.98407	13.73123	343.98432	12.74971	-11.84	337.11844	350.84967
1.00	336.91998	351.22748	344.07373	14.30750	343.91250	14.15306	-12.91	336.91998	351.22748
2.00	336.60342	351.59378	344.09860	14.99036	343.91861	14.67043	-14.95	336.60342	351.59378
3.00	336.37353	351.84952	344.11157	15.47589	343.92401	14.94157	-16.69	336.37353	351.84952
4.00	336.21179	352.02521	344.11902	15.81442	343.95456	15.10215	-18.21	336.21179	352.02521
5.00	336.06583	352.18054	344.12317	16.11472	343.95422	15.18794	-19.32	336.06583	352.18054
6.00	335.94357	352.31448	344.12903	16.37091	343.95416	15.25873	-20.55	335.94357	352.31448
10.00	335.55285	352.73117	344.14203	17.17831	342.95517	15.41820	-25.73	335.55285	352.73117
20.00	334.90836	353.38092	344.14465	18.47256	343.95615	15.46276	-37.56	334.90836	353.38092
30.00	334.46448	353.78336	344.12390	19.31888	343.95612	15.46506	-46.37	334.46448	353.78336
40.00	333.98141	354.14523	344.06332	20.16382	343.95615	15.46642	-52.41	333.98141	354.14523

BAND(MHZ)	328.200	352.200
LMIN(DB)	-0.42	
LMAX(DB)	0.37	
LDEL(DB)	0.79	
PMIN(DEG)	-2938.94	
PMAX(DEG)	2945.48	
PDEL(DEG)	5884.42	

File: 2CR5B05A.DAT Passband Symmetry = 0.3 dB

PHONON CORPORATION
FILE=2ER8B05A.DAT 13:30:36 04-13-1998
PN_100330_824 FINAL_FUNCTIONAL TEMP:R FLIGHT_3FUNCT /N WIDE_S21
04-13-1998 HP8752,SSREF,SSREF
FREQUENCY(MHZ): CENTER= 500.5 WIDTH= 999 INCR.= .208125 SYSTEM BANDWIDTH= 999
REFERENCES: LOSS(DB)= 29.103 PHASE(DEG)=-14375.46 DELAY(US)= 7.732795E-02 SLOPE(DB/MHZ)= 0
RMS ERRORS: LOSS(DB)= 11.89252 PHASE(DEG)= 8734.774
PLOT SCALES: LOSS 10 DB/DIV VS. FREQ 99.9 MHZ/DIV



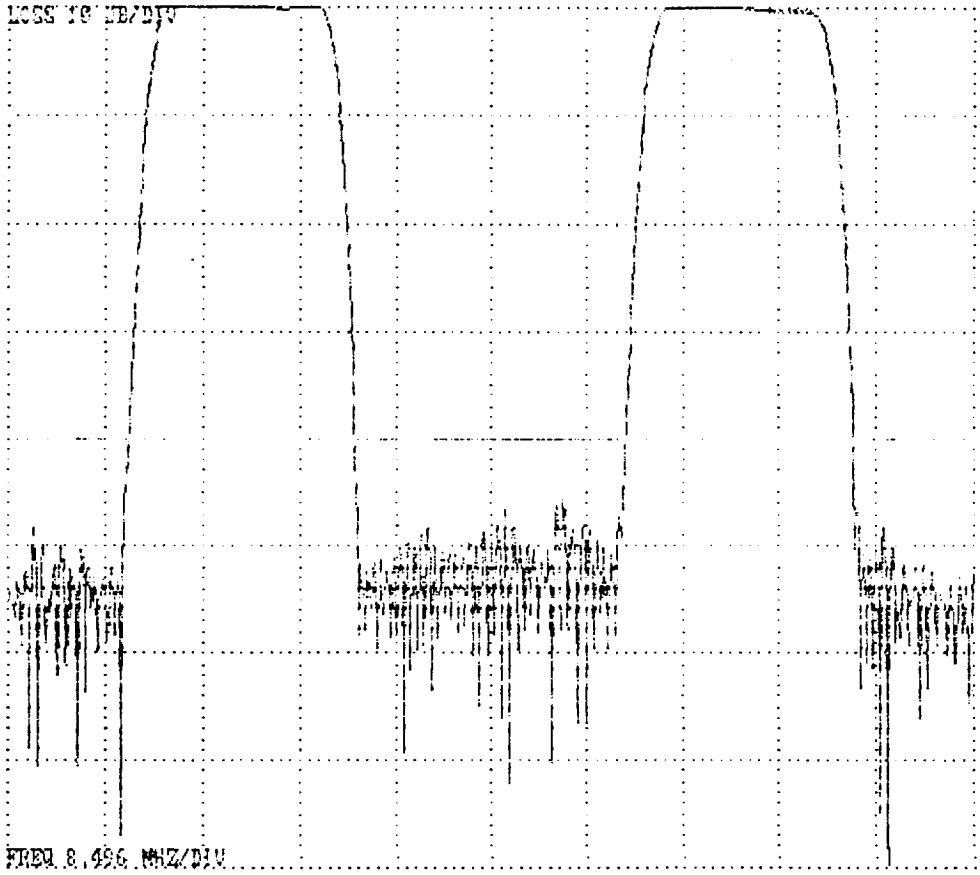
PEAK: LEVEL(DB)= 28.75362 FREQ(MHZ)= 339.4267 DELAY(US)=-1.205038 SIDELOBE(DB)=-45.84853
ENERGY: LEVEL(DB)= 29.29661 CENTER(MHZ)= 321.9174 WIDTH(MHZ)= 32.36074 SKEW(MHZ)= 77.87341

L(DB)	LO(MHZ)	HI(MHZ)	CTR(MHZ)	WID(MHZ)	AV-CTR(MHZ)	AV-WID(MHZ)	AV-SL(DB)	LOX(MHZ)	HIX(MHZ)
-2.35	339.42676	339.42676	339.42676	0.00000	339.42676	0.00000	0.00	339.42676	339.42676
0.50	327.14420	350.54133	343.89276	13.49713	343.72153	13.10942	-17.42	293.34000	350.64133
1.00	336.95153	351.16574	344.05869	14.21411	343.92188	13.83308	-17.60	293.03973	351.16574
2.00	336.60840	351.56873	344.08856	14.96033	343.92706	14.43581	-17.75	292.72644	351.56873
3.00	336.29675	351.83362	344.11517	15.43586	343.92957	14.67110	-17.81	292.51511	351.83362
4.00	336.22150	352.01221	344.11685	15.79071	343.93497	14.85004	-17.86	292.34402	352.01221
5.00	336.07440	352.16833	344.12137	16.09393	343.93948	14.99910	-17.90	292.20474	352.16833
6.00	335.95499	352.30701	344.13038	16.35202	343.93948	14.99910	-17.92	292.09131	352.30701
10.00	335.56295	352.72501	344.14447	17.16206	343.94827	15.15742	-17.94	291.71231	352.72501
20.00	334.91385	353.37503	344.14444	18.46118	343.95518	15.22216	-17.95	291.11185	353.37503
30.00	334.46252	353.78021	344.12137	19.31769	343.95565	15.22516	-17.95	290.65570	353.78021
40.00	333.98459	354.13330	344.05899	20.14852	343.95554	15.22509	-17.94	290.29845	354.13330

BAND(MHZ)	1.000	286.000	359.000 1000.000
LMIN(DB)	48.48	-0.35	44.61
LMAX(DB)	87.15	75.82	65.23
LDEL(DB)	38.68	75.37	20.61
PMIN(DEG)	4876.83	-5597.88	-5451.94
PMAX(DEG)	9999.00	9999.00	9999.00
PDEL(DEG)	5122.97	15596.88	16450.94

FILE: 2ER8B05A.DAT Out-of-band Rejection: PEAK= 44.6 d2 WIDTH= 0.000 MHz

PHONON CORPORATION
FILE=2FR8805A.DAT 13:30:57 04-13-1998
PN_100830_814 FINAL_FUNCTIONAL TEMP:R FLIGHT5_3FUNCT /N DUAL_SXX
04-13-1998 HP8753,SSREF,SSREF
FREQUENCY(MHZ): CENTER= 332.2 WIDTH= 84.96 INCR.= .12 SYSTEM BANDWIDTH= 85
REFERENCES: LOSS(DB)= 29.103 PHASE(DEG)= 3862.37 DELAY(US)= .781427 SLOPE(US/MHZ)= 0
RMS ERRORS: LOSS(DB)= 25.98687 PHASE(DEG)= 1326.401
PLOT SCALES: LOSS 10 DB/DIV VS. FREQ 8.496 MHZ/DIV



PEAK: LEVEL(DB)= 28.70858 FREQ(MHZ)= 329.3549 DELAY(US)= .1855741 SIDELOBE(DB)=-46.2194
ENERGY: LEVEL(DB)= 29.29135 CENTER(MHZ)= 321.7737 WIDTH(MHZ)= 32.33754 SKEW(MHZ)= .5210744

L(DB)	LO(MHZ)	HI(MHZ)	CTR(MHZ)	WID(MHZ)	AV-CTR(MHZ)	AV-WID(MHZ)	AV-SL(DB)	LOX(MHZ)	HIX(MHZ)
-0.39	329.36487	329.36487	329.36487	0.00000	329.36487	0.00000	0.00	329.36487	329.36487
0.50	337.15143	350.63617	343.89380	13.48474	342.78359	13.84019	-6.06	293.34753	350.80334
1.00	336.96643	351.20300	344.08472	14.23657	343.92775	13.86224	-6.17	293.03687	351.20300
2.00	336.62265	351.57816	344.10040	14.95551	343.93045	14.39242	-6.26	292.72208	351.57816
3.00	336.38403	351.83862	344.11133	15.45459	343.93341	14.67485	-6.31	292.51547	351.83862
4.00	336.22403	352.01544	344.11975	15.79141	343.93823	14.89409	-6.35	292.34424	352.01544
5.00	336.07565	352.17294	344.12430	16.09729	343.94043	14.97854	-6.35	292.20554	352.17294
6.00	335.95084	352.30785	344.12933	16.35703	343.94287	15.04816	-6.35	292.09487	352.30785
10.00	335.55875	352.72495	344.14185	17.16620	343.95728	15.19452	-6.34	291.71246	352.72495
20.00	334.91165	353.37817	344.14490	18.46652	343.95569	15.24960	-6.27	291.11169	353.37817
30.00	334.46609	353.77994	344.12302	19.31384	343.95624	15.25294	-6.22	290.65079	353.77994
40.00	333.97943	354.14310	344.06128	20.16367	343.95615	15.25229	-6.16	290.29770	354.14310

BAND(MHZ)	294.200	306.200	338.200	350.200
LMIN(DB)	-0.27	-0.34	-0.39	
LMAX(DB)	0.21	72.03	0.43	
LDEL(DB)	0.48	72.36	0.82	
PMIN(DEG)	-1916.96	-2858.29	-918.05	
PMAX(DEG)	641.25	2549.90	1565.06	
PDEL(DEG)	2558.21	5410.19	2483.10	

FILE: 2FR8805A.DAT Out-of-band Rejection: PEAK= 45.8 dB WIDTH= 0.000 MHz

PHONON CORPORATION
FILE: 8FR0305A.DAT (+SSCF)
PN_122330_824 FINAL_FUNCTIONAL TEMP:R FLIGHT5_3FUNCT /N DUAL_SYX
04-13-1998 HP8753,SSREF,SSREF,SSCF
REFERENCES: LOSS(DB)= 29.103 PHASE(DEG)= 3962.37
DELAY(US)= .781427 SLOPE(US/MHZ)= 0

BANDPASS CHARACTERISTICS MEASUREMENT

FREQUENCY(MHZ)	LOSS(DB)	PHASE(DEG)
285.402	54.46	515.15
288.030	58.27	1632.92
290.760	1.83	958.98
295.440	-0.14	165.33
300.120	-0.09	-627.35
303.600	0.22	-1419.37
307.452	0.27	-2211.20
311.130	53.27	-2993.33
314.240	50.50	-1597.40
318.522	51.75	-555.05
322.200	49.73	498.69
325.890	52.52	1180.20
329.562	50.44	1442.75
333.240	55.19	2535.41
336.930	1.89	1947.70
340.590	-0.13	1877.80
344.268	0.11	308.32
347.952	0.37	-461.65
351.642	0.33	-1236.83
355.332	58.99	-1788.25
359.022	59.23	-748.29

ELECTRICAL TEST DATA SHEET

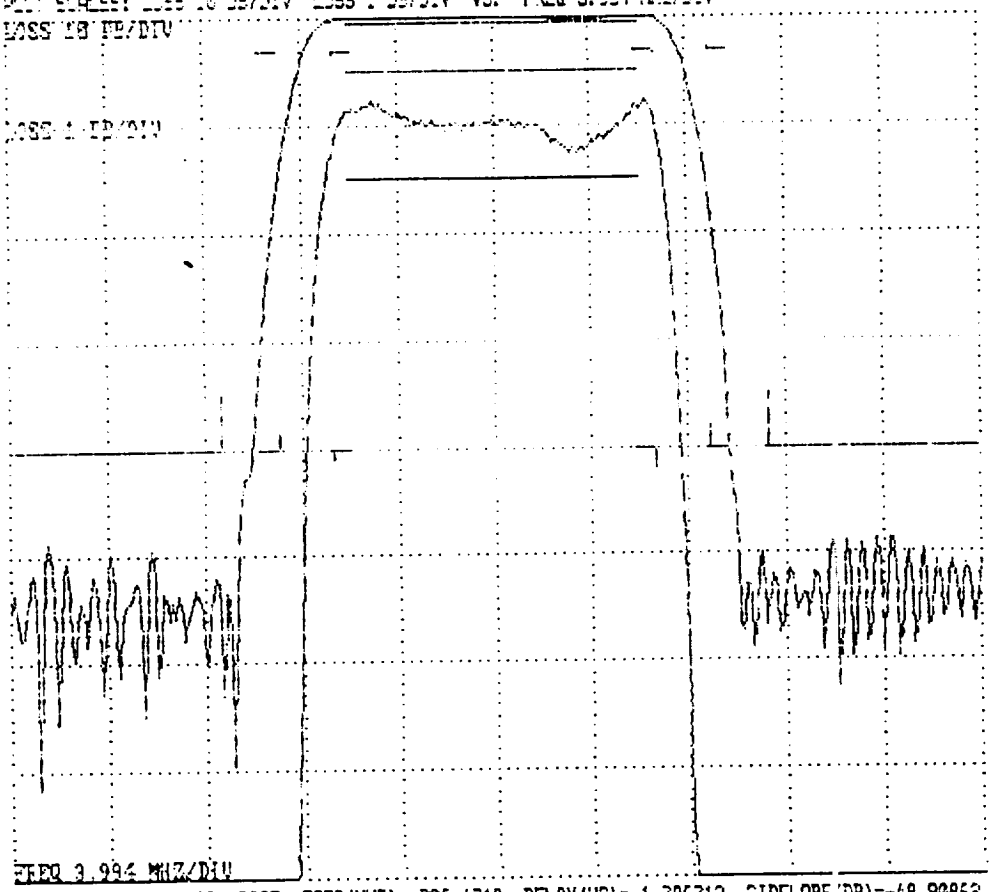
AEROJET PART: 1331576-2 PHONON PART: 100824 SERIAL: B05
TESTED BY: 210 TITLE: test tech DATE: 4/13/99 TIME: 2:30pm
TEST: FINAL FUNCTIONAL
EQUIPMENT: HP 8753D SERIAL: 3410A04374 CAL DUE: 1/29/99
HP 3478A SERIAL: 2136A03127 CAL DUE: 7/7/98

PARAGRAPH REQ.	PARAGRAPH Q/ATP	REQUIREMENT TITLE	DATA		P/F
3.2.1.1	5.2.1	OPERATING TEMPERATURE	35.4	C	P
3.2.1.3	5.2.3	CENTER FREQUENCY &			
3.2.1.4		CENTER FREQUENCY STABILITY			
		LO: 299.335/301.065 MHz	300.131	MHz	P
		HI: 343.335/345.065 MHz	344.000	MHz	P
3.2.1.5	5.2.4	3 dB BANDWIDTH:			
		LO: 15/16 MHz	15.421	MHz	P
		HI: 15/16 MHz	15.471	MHz	P
3.2.1.6	5.2.5	PASSBAND SYMMETRY			
		LO: /0.5 dB	0.0	dB	P
		HI: /0.5 dB	0.2	dB	P
3.2.1.7	5.2.6	PASSBAND RIPPLE			
		294.2-306.2 MHz: /1.0 dB	0.4	dB	P
		338.2-350.2 MHz: /1.0 dB	0.6	dB	P
3.2.1.8	5.2.7	INSERTION LOSS			
		LO: 27.8/30.2 dB	29.4	dB	P
		HI: 27.8/30.2 dB	29.2	dB	P
3.2.1.9	5.2.8	INSERTION LOSS VARIATION			
		LO: -0.4/0.4 dB	0.3	dB	P
		HI: -0.4/0.4 dB	0.1	dB	P
3.2.1.10	5.2.9	AMPLITUDE BALANCE			
		LO,HI: /0.5 dB	0.2	dB	P
3.2.1.11	5.2.10	OUT-OF-BAND REJECTION			
		BAND	PEAK(dB)	WIDTH(MHz)	
		WIDE: 1-286,359-1000 MHz:	44.8	0.000	
		DUAL: 286.000-288.935, 311.465-332.935, 355.465-359.00 MHz:	45.7	0.000	
		PEAK: 35.0/ dB	44.8 dB		P
		WIDTH: /3.2 MHz		0.000 MHz	P
3.2.1.12	5.2.11	SHAPE FACTOR			
		LO: /1.30 Unitless	1.27	Unitless	P
		HI: /1.30 Unitless	1.30	Unitless	P
3.2.1.14	5.2.12	VSWR (RETURN LOSS)			
		294.2-306.2,338.2-350.2 MHz			
		DUAL S11: 7.5/ dB	13.1	dB	P
		DUAL S22: 7.5/ dB	8.0	dB	P
4.8.2	5.2.14	LIMITED FUNCTIONAL TESTS			
		CENTER FREQUENCY: -0.2/0.2 MHz	0	MHz	P
		3 dB BANDWIDTH: -0.32/0.32 MHz	0	MHz	P
		INSERTION LOSS: -0.5/0.5 dB	0	dB	P
NONE	5.2.15	DATA SHEET SUMMARY (PASS/FAIL)	P		P

PHONON CORPORATION
7 HERMAN DRIVE
SIMSBURY, CT 06070

CAGE: 6Y858
TEL: 203-651-0211
FAX: 203-651-8618

PHONON CORPORATION
FILE=2AH8805A.DAT 13:41:43 04-13-1998
PN_100930_824 FINAL_FUNCTIONAL TEMP:H FLIGHTS_2F.DAT /N DUAL_SXX
04-13-1998 #:2752,SSCF,SSFFIX,SSREF
FREQUENCY(MHZ): CENTER= 300.2 WIDTH= 29.84 INCR.= .12 SYSTEM BANDWIDTH= 12
REFERENCES: LOSS(DB)= 29.37685 PHASE(DEG)= 20061.98 DELAY(US)= 0 SLOPE(US/MHZ)= 0
RMS ERRORS: LOSS(DB)= .1156373 PHASE(DEG)= 1728.065
PLOT SCALES: LOSS 10 DB/DIV LOSS 1 DB/DIV VS. FREQ 3.984 MHZ/DIV

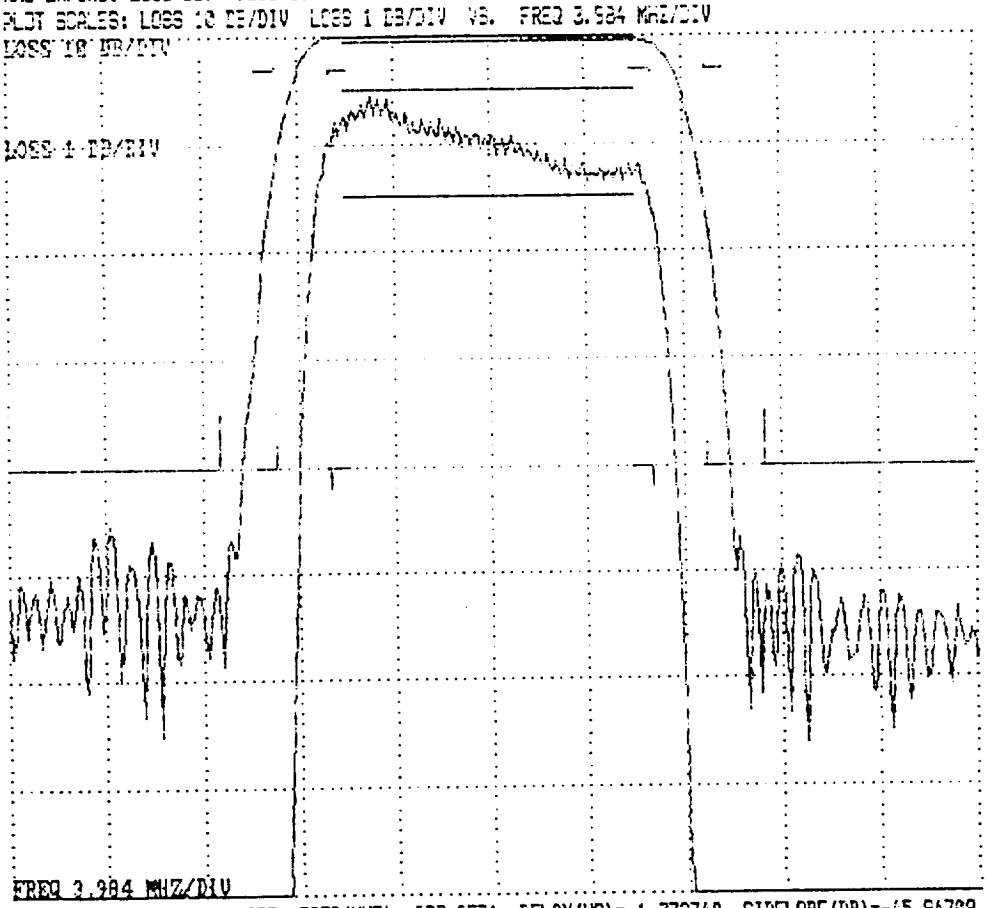


PEAK: LEVEL(DB)= 29.13585 FREQ(MHZ)= 306.4316 DELAY(US)=-1.386312 SIDELOBE(DB)=-48.90852
ENEREY: LEVEL(DB)= 29.55344 CENTER(MHZ)= 300.1058 WIDTH(MHZ)= 15.13142 SKE((MHZ)= 7.3802595-02

L(DB)	LO(MHZ)	HI(MHZ)	CTR(MHZ)	WID(MHZ)	AV-CTR(MHZ)	AV-WID(MHZ)	AV-SL(DB)	LOX(MHZ)	HIX(MHZ)
-0.24	306.43179	306.43179	306.43179	0.00000	306.43179	0.0000)	0.00	306.43179	306.43179
0.50	293.25797	307.19916	300.22858	13.94119	300.21805	13.9151\	-12.19	293.25797	307.19916
1.00	292.94797	307.39038	300.16919	14.44241	300.11670	14.3241\	-13.41	292.94797	307.39038
2.00	292.62357	307.64267	300.13312	15.01910	300.11896	14.8347)	-15.81	292.62357	307.64267
3.00	292.42053	307.84146	300.13098	15.42093	300.11844	14.9585\	-15.74	292.42053	307.84146
4.00	292.24960	307.99786	300.12323	15.74927	300.09189	15.1347)	-18.35	292.24860	307.99785
5.00	292.11053	308.12943	300.12002	16.01889	300.11533	15.2625)	-20.25	292.11053	308.12543
6.00	291.98816	308.24197	300.11505	16.25381	300.11377	15.3256\	-21.64	291.98816	308.24197
10.00	291.61475	308.60480	300.10977	16.99005	300.10959	15.4383)	-26.59	291.61475	308.60480
20.00	291.31089	309.19037	300.10065	18.17947	300.10565	15.4941\	-36.82	291.31089	309.19037
30.00	292.54617	309.59592	300.07153	19.05075	300.10587	15.4883\	-48.10	290.54617	309.59592
40.00	290.18881	309.84842	300.01862	19.65961	300.10583	15.4885)	-52.52	290.18581	309.84842

BAND(MHZ) 294.200 305.200
LMIN(DB) -0.22
LMAX(DB) 0.26
LDEL(DB) 0.48
PMIN(DEG) -2978.77
PMAX(DEG) 2983.60
PDEL(DEG) 5962.37
File: 2AH88C5A.DAT Passband Symmetry = 0.0 dB

PHONON CORPORATION
FILE=2048B05A.DAT 12:42:28 04-13-1998
PN_100830_824 FINAL_FUNCTIONAL TEMP:H FLIGHT5_3FUNCT /N DUAL_SXX
04-13-1998 MP8752,SSCF,SSFFIX,SSREF
FREQUENCY(MHZ): CENTER= 344.2 WIDTH= 39.84 INCR.= .12 SYSTEM BANDWIDTH= 12
REFERENCES: LOSS(DB)= 29.2216 PHASE(DEG)= 7207.211 DELAY(US)= 0 SLOPE(US/MHZ)= 0
RMS ERRORS: LOSS(DB)= .2164853 PHASE(DEG)= 1716.115
PLOT SCALES: LOSS 10 DB/DIV LOSS 1 DB/DIV VS. FREQ 3.984 MHZ/DIV



PEAK: LEVEL(DB)= 28.78699 FREQ(MHZ)= 339.2571 DELAY(US)=-1.372748 SIDELOBE(DB)=-45.54709
ENERGY: LEVEL(DB)= 29.41971 CENTER(MHZ)= 343.8451 WIDTH(MHZ)= 16.20185 SKEW(MHZ)= .2859345

L(DB)	LO(MHZ)	HI(MHZ)	CTR(MHZ)	WID(MHZ)	AV-CTR(MHZ)	AV-WID(MHZ)	AV-SL(DB)	LCX(MHZ)	HIX(MHZ)
-0.43	339.25714	339.25714	339.25714	0.00000	339.25714	0.00000	0.00	339.25714	339.25714
0.50	337.00543	350.74564	343.87604	13.74121	343.73853	13.65931	-11.59	337.00543	350.74564
1.00	335.82169	351.11819	343.96994	14.29651	343.79599	14.17137	-12.93	335.82169	351.11819
2.00	335.49667	351.47922	343.98795	14.98254	343.80417	14.69827	-14.99	335.49667	351.47922
3.00	336.26416	351.73486	343.99951	15.47070	343.81082	14.95926	-16.72	336.26416	351.73486
4.00	336.10297	351.90811	344.00555	15.80515	343.84189	15.11845	-18.26	336.10297	351.90811
5.00	335.95679	352.06329	344.01004	16.10651	343.84204	15.22355	-19.37	335.95679	352.06329
6.00	335.83337	352.19501	344.01419	16.36163	343.84232	15.27387	-20.60	335.83337	352.19501
10.00	335.43918	352.60950	344.02435	17.17032	343.84399	15.43172	-26.80	335.43918	352.60950
20.00	334.79568	353.25875	344.02722	18.46387	343.84515	15.47585	-37.63	334.79568	353.25875
30.02	334.34760	353.66510	344.00635	19.31750	343.84512	15.47889	-46.45	334.34760	353.66510
40.00	333.86252	354.01459	343.93954	20.15207	343.84515	15.47925	-52.53	333.86252	354.01459

BAND(MHZ)	338.200	350.200
LMIN(DB)	-0.43	
LMAX(DB)	0.36	
LDEL(DB)	0.79	
PMIN(DEG)	-2939.38	
PMAX(DEG)	2946.00	
PDEL(DEG)	5885.38	

File: 2048B05A.DAT Passband Symmetry = 0.2 dB

Channel 13 Bandpass Filter

SAW Filter (S/N: 1331576-3, S/N: B05)

ELECTRICAL TEST DATA SHEET

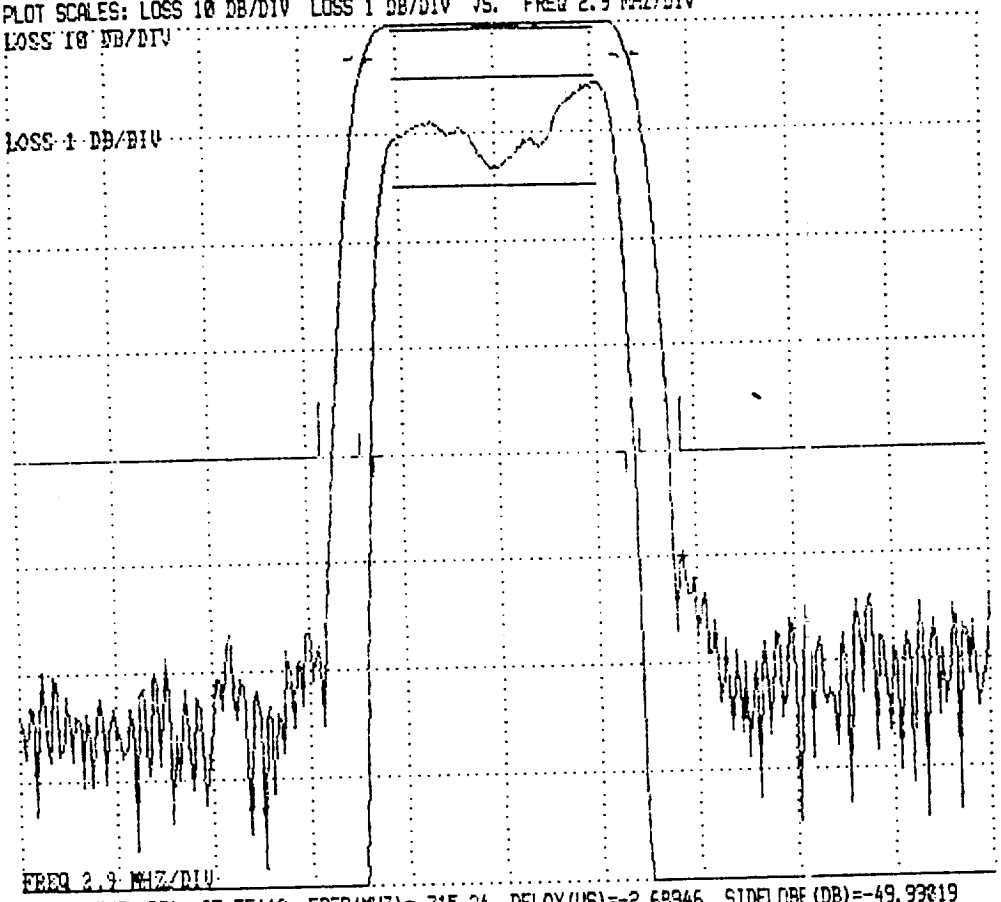
EROJET PART: 1331576-3 PHONON PART: 100825 SERIAL: B05
TESTED BY: 210 TITLE: Test Tech DATE: 4/13/98 TIME: 2:30 pm
TEST: FINAL FUNCTIONAL
EQUIPMENT: HP 8753D SERIAL: 3416A04374 CAL DUE: 1/29/99
HP 3478A SERIAL: 2136A03127 CAL DUE: 7/7/98

PARAGRAPH REQ.	PARAGRAPH Q/ATP	REQUIREMENT TITLE	DATA		P/F
3.2.1.1	5.2.1	OPERATING TEMPERATURE	-5.1	C	P
3.2.1.3	5.2.3	CENTER FREQUENCY &			
3.2.1.4		CENTER FREQUENCY STABILITY			
		LO: 312.035/312.365 MHz	312.269	MHz	P
		HI: 332.035/332.365 MHz	332.229	MHz	P
3.2.1.5	5.2.4	3 dB BANDWIDTH:			
		LO: 7.8/8.0 MHz	7.824	MHz	P
		HI: 7.8/8.0 MHz	7.877	MHz	P
3.2.1.6	5.2.5	PASSBAND SYMMETRY			
		LO: /0.5 dB	0.3	dB	P
		HI: /0.5 dB	0.1	dB	P
3.2.1.7	5.2.6	PASSBAND RIPPLE			
		309.2-315.2 MHz: /1.0 dB	0.8	dB	P
		329.2-335.2 MHz: /1.0 dB	0.4	dB	P
3.2.1.8	5.2.7	INSERTION LOSS			
		LO: 27.8/30.2 dB	28.0	dB	P
		HI: 27.8/30.2 dB	27.9	dB	P
3.2.1.9	5.2.8	INSERTION LOSS VARIATION			
		LO: -0.4/0.4 dB	-0.2	dB	P
		HI: -0.4/0.4 dB	-0.3	dB	P
3.2.1.10	5.2.9	AMPLITUDE BALANCE			
		LO,HI: /0.5 dB	0.1	dB	P
3.2.1.11	5.2.10	OUT-OF-BAND REJECTION			
		BAND	PEAK(dB)	WIDTH(MHz)	
		WIDE: 1-303,342-1000 MHz:	47.0	0.000	
		DUAL: 303.000-306.835,			
		317.565-326.835,			
		337.565-342.00 MHz:	46.9	0.000	
		PEAK: 35.0/ dB	46.9	dB	P
		WIDTH: /1.6 MHz		0.000 MHz	P
3.2.1.12	5.2.11	SHAPE FACTOR			
		LO: /1.30 Unitless	1.28	Unitless	P
		HI: /1.30 Unitless	1.26	Unitless	P
3.2.1.14	5.2.12	VSWR (RETURN LOSS)			
		309.2-315.2,329.2-335.2 MHz			
		DUAL S11: 7.5/ dB	9.8	dB	P
		DUAL S22: 7.5/ dB	8.3	dB	P
4.8.2	5.2.14	LIMITED FUNCTIONAL TESTS			
		CENTER FREQUENCY: -0.1/0.1 MHz	0	MHz	P
		3 dB BANDWIDTH: -0.16/0.16 MHz	0	MHz	P
		INSERTION LOSS: -0.5/0.5 dB	0	dB	P
NONE	5.2.15	DATA SHEET SUMMARY (PASS/FAIL)	P (DP)		

PHONON CORPORATION
7 HERMAN DRIVE
SIMSBURY, CT 06070

CAGE: 6Y858
TEL: 203-651-8211
FAX: 203-651-8618

PHONON CORPORATION
FILE=3AC8B05A.DAT 13:19:41 04-13-1998
PN_100832_825 FINAL_FUNCTIONAL TEMP:C FLIGHT5_3FUNCT /N DUAL_SXX
04-13-1998 HP8753,SSCF,SSFFIX,SSREF
FREQUENCY(MHZ): CENTER= 312.2 WIDTH= 29 INCR.= .1 SYSTEM BANDWIDTH= 6
REFERENCES: LOSS(DB)= 27.99412 PHASE(DEG)=-48671.97 DELAY(US)= 0 SLOPE(US/MHZ)= 0
RMS ERRORS: LOSS(DB)= .1999279 PHASE(DEG)= 1646.685
PLOT SCALES: LOSS 10 DB/DIV LOSS 1 DB/DIV VS. FREQ 2.9 MHZ/DIV



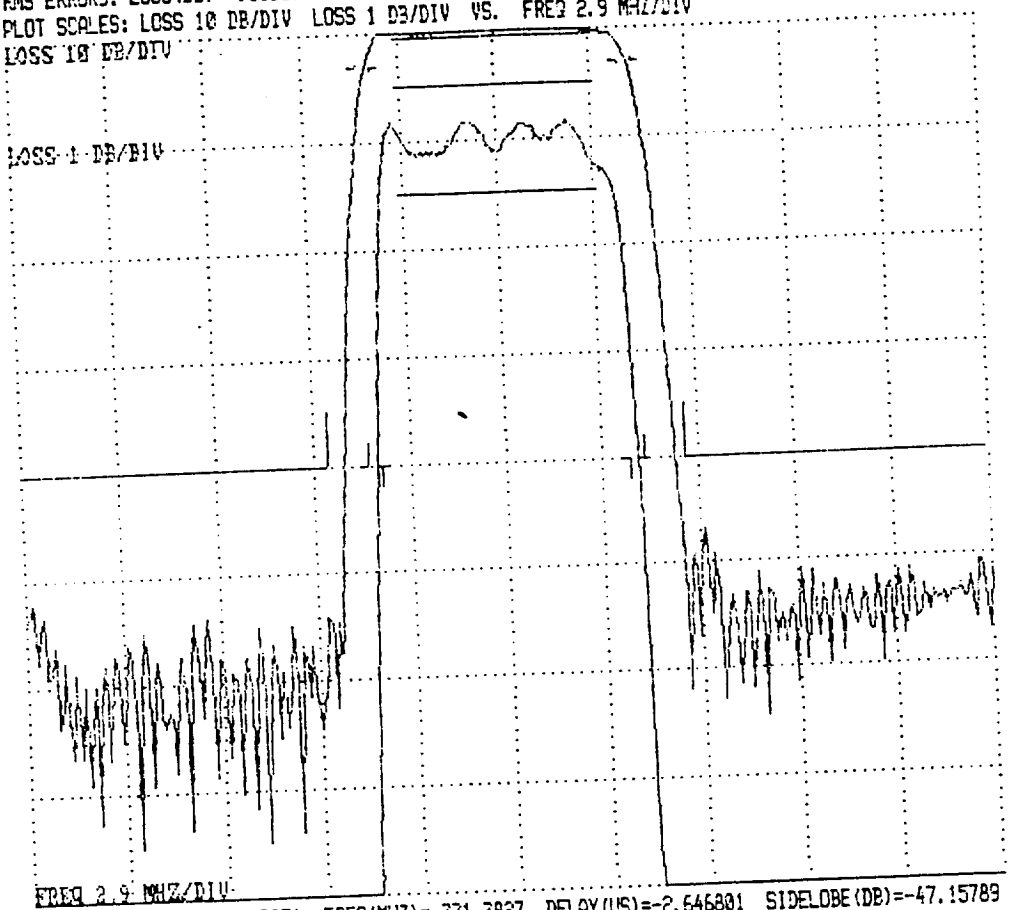
PEAK: LEVEL(DB)= 27.55412 FREQ(MHZ)= 315.24 DELAY(US)=-2.68946 SIDELOBE(DB)=-49.93019
ENERGY: LEVEL(DB)= 28.15551 CENTER(MHZ)= 312.3183 WIDTH(MHZ)= 8.188031 SKEW(MHZ)=-6.988944E-02

L(DB)	LO(MHZ)	HI(MHZ)	CTR(MHZ)	WID(MHZ)	AV-CTR(MHZ)	AV-WID(MHZ)	AV-SL(DB)	LOX(MHZ)	HIX(MHZ)
-0.44	315.24002	315.24002	315.24002	0.00000	315.24002	0.00000	0.00	315.24002	315.24002
0.50	308.79263	315.84186	312.31725	7.04922	312.35022	7.01969	-14.57	308.79263	315.84186
1.00	308.64890	315.93851	312.29370	7.28961	312.34952	7.08686	-15.59	308.64890	315.93851
2.00	308.47388	316.07895	312.27643	7.60507	312.31329	7.00078	-17.43	308.47388	316.07895
3.00	308.35718	316.18152	312.26935	7.82434	312.31512	7.01622	-18.92	308.35718	316.18152
4.00	308.26520	316.26501	312.26563	7.99881	312.31650	7.00762	-20.65	308.26620	316.26501
5.00	308.19049	316.33493	312.26270	8.14444	312.31747	7.07589	-22.67	308.19049	316.33493
6.00	308.12469	316.39551	312.26010	8.27081	312.31747	7.07589	-22.64	308.12469	316.39551
10.00	307.92380	316.58664	312.25522	8.66264	312.31830	7.05390	-27.61	307.92380	316.58664
20.00	307.59882	316.89594	312.24738	9.29712	312.31781	7.08733	-39.95	307.59882	316.89594
30.00	307.37476	317.09723	312.23599	9.72247	312.31827	7.08915	-50.28	307.37476	317.09723
40.00	307.20126	317.22037	312.21082	10.01910	312.31830	7.08930	-59.54	307.20126	317.22037

BAND(MHZ)	309.200	315.200
LMIN(DB)	-0.42	
LMAX(DB)	0.33	
LDEL(DB)	0.75	
PMIN(DEG)	-2804.04	
PMAX(DEG)	2903.65	
PDEL(DEG)	5707.68	

File: 3AC8B05A.DAT Passband Symmetry = 0.3 dB

PHONON CORPORATION
FILE=3CC8B05A.DAT 13:20:26 04-13-1998
PN_100832_825 FINAL_FUNCTIONAL TEMP:C FLIGHT5_3FUNCT /N DUAL_SXX
04-13-1998 HP8753,SSCF,SSFFIX,SSREF
FREQUENCY(MHZ): CENTER= 332.2 WIDTH= 29 INCR.= .1 SYSTEM BANDWIDTH= 6
REFERENCES: LOSS(DB)= 27.86153 PHASE(DEG)=-55035.87 DELAY(US)= 0 SLOPE(US/MHZ)= 0
RMS ERRORS: LOSS(DB)= .1085213 PHASE(DEG)= 1626.521
PLOT SCALES: LOSS 10 DB/DIV LOSS 1 DB/DIV VS. FREQ 2.9 MHZ/DIV



PEAK: LEVEL(DB)= 27.67071 FREQ(MHZ)= 331.3827 DELAY(US)=-2.646801 SIDELOBE(DB)=-47.15789
ENERGY: LEVEL(DB)= 28.0585 CENTER(MHZ)= 332.209 WIDTH(MHZ)= 8.232259 SKEW(MHZ)= 1.598547E-02

L(DB)	LO(MHZ)	HI(MHZ)	CTR(MHZ)	WID(MHZ)	AV-CTR(MHZ)	AV-WID(MHZ)	AV-SL(DB)	LOX(MHZ)	HIX(MHZ)
-0.19	331.38266	331.38266	331.38266	0.00000	331.38266	0.00000	0.00	331.38266	331.38266
0.50	328.60480	335.65933	332.13208	7.05453	332.13742	6.97443	-13.93	328.60480	335.65933
1.00	328.51834	335.86462	332.19147	7.34628	332.17969	7.23468	-15.36	328.51834	335.86462
2.00	328.38397	336.04684	332.21539	7.56287	332.18167	7.52319	-17.94	328.38397	336.04684
3.00	328.28995	336.16730	332.22864	7.87735	332.18506	7.63259	-19.56	328.28995	336.16730
4.00	328.21475	336.25754	332.23615	8.04279	332.20932	7.67876	-20.48	328.21475	336.25754
5.00	328.15396	336.32806	332.24103	8.17410	332.20822	7.75163	-22.57	328.15396	336.32806
6.00	328.09546	336.39148	332.24347	8.29582	332.19457	7.77724	-23.63	328.09546	336.39148
10.00	327.91857	336.58707	332.25287	8.66840	332.20782	7.83321	-27.77	327.91857	336.58707
20.00	327.62894	336.89084	332.25989	9.26190	332.20871	7.86484	-39.82	327.62894	336.89084
30.00	327.44388	337.10202	332.27295	9.65814	332.20895	7.86718	-51.15	327.44388	337.10202
40.00	327.29533	337.25369	332.27582	9.95737	332.20932	7.86726	-54.80	327.29533	337.25369

BAND(MHZ)	329.200	335.200
LMIN(DB)	-0.19	
LMAX(DB)	0.26	
LDEL(DB)	0.45	
PMIN(DEG)	-2774.81	
PMAX(DEG)	2862.58	
PDEL(DEG)	5637.40	

File: 3CC8B05A.DAT Passband Symmetry = 0.1 dB

ELECTRICAL TEST DATA SHEET

AEROJET PART: 1331576-3 PHONON PART: 100825 SERIAL: 005
TESTED BY: 210 TITLE: Test Tech DATE: 4/13/98 TIME: 2:30 p/1
TEST: FINAL FUNCTIONAL
EQUIPMENT: HP 8753D SERIAL: 3410A04374 CAL DUE: 1/29/99
HP 3478A SERIAL: 2136A03127 CAL DUE: 7/7/98

PARAGRAPH REQ.	PARAGRAPH Q/ATP	REQUIREMENT TITLE	DATA		P/F
3.2.1.1	5.2.1	OPERATING TEMPERATURE	15.0	C	P
3.2.1.3	5.2.3	CENTER FREQUENCY &			
3.2.1.4		CENTER FREQUENCY STABILITY			
		LO: 312.035/312.365 MHz	312.281	MHz	P
		HI: 332.035/332.365 MHz	332.242	MHz	P
3.2.1.5	5.2.4	3 dB BANDWIDTH:			
		LO: 7.8/8.0 MHz	7.822	MHz	P
		HI: 7.8/8.0 MHz	7.879	MHz	P
3.2.1.6	5.2.5	PASSBAND SYMMETRY			
		LO: /0.5 dB	0.3	dB	P
		HI: /0.5 dB	0.0	dB	P
3.2.1.7	5.2.6	PASSBAND RIPPLE			
		309.2-315.2 MHz: /1.0 dB	0.8	dB	P
		329.2-335.2 MHz: /1.0 dB	0.4	dB	P
3.2.1.8	5.2.7	INSERTION LOSS			
		LO: 27.8/30.2 dB	28.2	dB	P
		HI: 27.8/30.2 dB	28.2	dB	P
3.2.1.9	5.2.8	INSERTION LOSS VARIATION			
		LO: -0.4/0.4 dB	0.0	dB	P
		HI: -0.4/0.4 dB	0.0	dB	P
3.2.1.10	5.2.9	AMPLITUDE BALANCE			
		LO,HI: /0.5 dB	0.0	dB	P
3.2.1.11	5.2.10	OUT-OF-BAND REJECTION			
		BAND	PEAK(dB)	WIDTH(MHz)	
		WIDE: 1-303,342-1000 MHz:	47.2	0.000	
		DUAL: 303.000-306.835,			
		317.565-326.835,			
		337.565-342.00 MHz:	47.4	0.000	
		PEAK: 35.0/ dB	47.2	dB	P
		WIDTH: /1.6 MHz		0.000 MHz	P
3.2.1.12	5.2.11	SHAPE FACTOR			
		LO: /1.30 Unitless	1.28	Unitless	P
		HI: /1.30 Unitless	1.26	Unitless	P
3.2.1.14	5.2.12	VSWR (RETURN LOSS)			
		309.2-315.2,329.2-335.2 MHz			
		DUAL S11: 7.5/ dB	9.9	dB	P
		DUAL S22: 7.5/ dB	8.4	dB	P
4.8.2	5.2.14	LIMITED FUNCTIONAL TESTS			
		CENTER FREQUENCY: -0.1/0.1 MHz	-0.001	MHz	P
		3 dB BANDWIDTH: -0.16/0.16 MHz	±0.002	MHz	P
		INSERTION LOSS: -0.5/0.5 dB	±0.2	dB	P
NONE	5.2.15	DATA SHEET SUMMARY (PASS/FAIL)	P (DP)		

PHONON CORPORATION
7 HERMAN DRIVE
SIMSBURY, CT 06070

CAGE: 61858
TEL: 203-651-8211
FAX: 203-651-8618

PHONON CORPORATION

FILE=3AR8805A.DAT 12:32:04 04-13-1998

PN_100832_825 FINAL_FUNCTIONAL TEMP:R FLIGHT5_3FUNCT /N DUAL_5XX

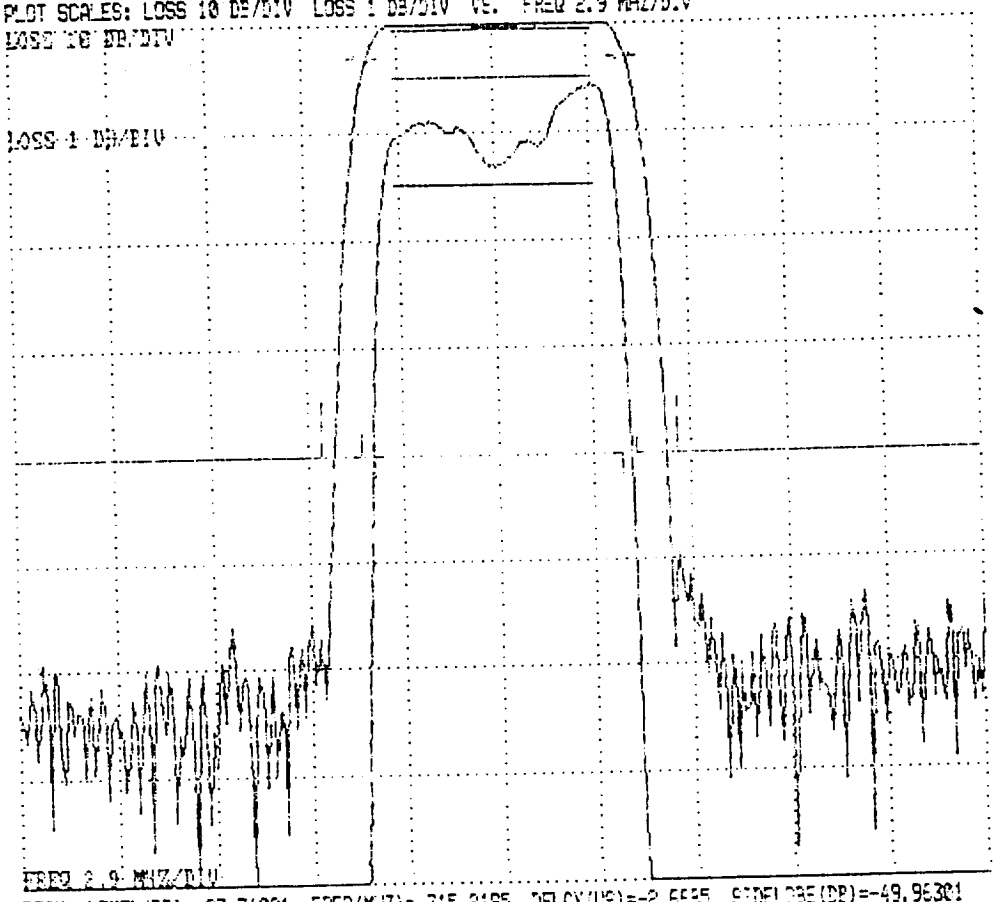
04-13-1998 HP8753,SSCF,SSFFIX,SSREF

FREQUENCY(MHZ): CENTER= 312.2 WIDTH= 29 INCR.= .1 SYSTEM BANDWIDTH= 5

REFERENCES: LOSS(DB)= 28.1857 PHASE(DEG)=-51412.69 DELAY(US)= 0 SLOPE(US/MHZ)= 0

RMS ERRORS: LOSS(DB)= .1980499 PHASE(DEG)= 1645.581

PLOT SCALES: LOSS 10 DB/DIV LOSS 1 DB/DIV VS. FREQ 2.9 MHZ/DIV



PEAK: LEVEL(DB)= 27.74021 FREQ(MHZ)= 315.2195 DELAY(US)=-2.6635 SIDELOBE(DB)=-49.96301

ENERGY: LEVEL(DB)= 28.34684 CENTER(MHZ)= 312.3291 WIDTH(MHZ)= 8.187827 SKEW(MHZ)=-6.529921E-02

L(DB)	LO(MHZ)	HI(MHZ)	CTR(MHZ)	WID(MHZ)	AV-CTR(MHZ)	AV-WID(MHZ)	AV-SL(DB)	LOX(MHZ)	HIX(MHZ)
-0.45	315.21951	315.21951	315.21951	0.00000	315.21951	0.00000	0.00	315.21951	315.21951
0.50	308.80275	315.85522	312.32898	7.05246	312.39485	7.03194	-14.03	308.80276	315.85522
1.00	308.66052	315.94985	312.30527	7.28918	312.34991	7.28842	-15.59	308.65059	315.94985
2.00	308.48721	316.09174	312.28949	7.60452	312.31564	7.58152	-17.42	308.48721	316.09174
3.00	308.37021	316.19269	312.28143	7.82248	312.31897	7.61709	-18.91	308.37021	316.19269
4.00	308.27936	316.27774	312.27855	7.99838	312.32181	7.70851	-20.64	308.27936	316.27774
5.00	308.20385	316.34769	312.27576	8.14383	312.34068	7.74567	-21.60	308.20385	316.34769
6.00	308.13797	316.40823	312.27310	8.27026	312.33783	7.80285	-23.75	308.13797	316.40823
10.00	307.93729	316.59349	312.26537	8.66220	312.32736	7.85512	-27.59	307.93729	316.59349
20.00	307.61316	316.90881	312.26099	9.29555	312.32959	7.88676	-40.10	307.61316	316.90581
30.00	307.38837	317.11075	312.24957	9.72238	312.32910	7.89052	-53.80	307.38837	317.11075
40.00	307.21439	317.23824	312.22333	10.01785	312.32907	7.89067	-59.07	307.21439	317.23824

BAND(MHZ) 309.203 315.200

LMIN(DB) -0.42

LMAX(DB) 0.34

LDEL(DB) 0.76

PMIN(DEG) -2803.84

PMAX(DEG) 2903.52

PDEL(DEG) 5707.36

File: 3AR8805A.DAT Passband 3,reetry = 0.3 dB

PHONON CORPORATION

FILE=3DB3805A.DAT 13:32:57 04-13-1998

PN_102832_325 FINAL_FUNCTIONAL TEMP:R FLIGHTS_3FUNCT /N DUAL_SXX

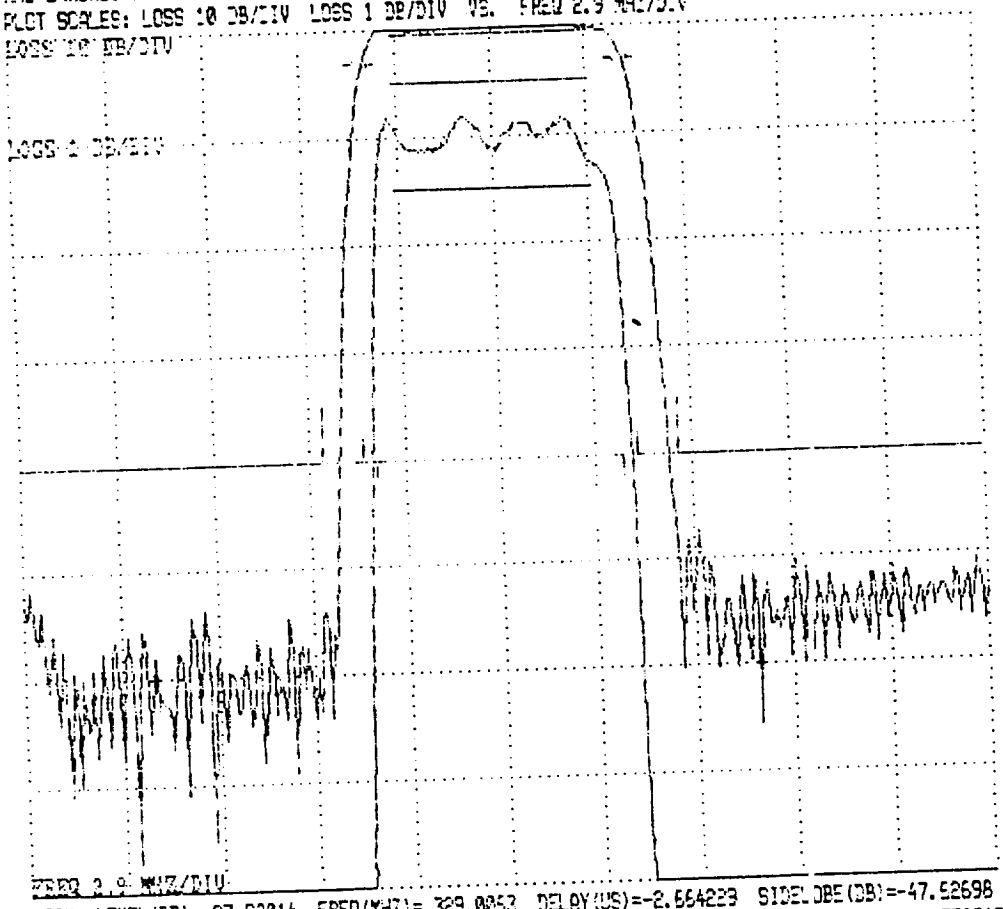
04-13-1998 HP8753,SSCF,SSFFIX,SSREF

FREQUENCY(MHZ): CENTER= 332.2 WIDTH= 39 INCR.= .1 SYSTEM BANDWIDTH= 6

REFERENCES: LOSS(DB)= 28.17373 PHASE(DEG)=-67056.02 DELAY(US)= 0 SLOPE(US/MHZ)= 0

RMS ERRORS: LOSS(DB)= .1074797 PHASE(DEG)= 1526.432

PLOT SCALES: LOSS 10 DB/DIV LOSS 1 DB/DIV VS. FREQ 2.9 MHZ/DIV



PEAK: LEVEL(DB)= 27.98014 FREQ(MHZ)= 329.0852 DELAY(US)=-2.664229 SIDELOBE(DB)=-47.52698

ENERGY: LEVEL(DB)= 28.3711 CENTER(MHZ)= 332.2229 WIDTH(MHZ)= 8.232573 SKEW(MHZ)= 1.550319E-02

L(DB)	LO(MHZ)	HI(MHZ)	CTR(MHZ)	WID(MHZ)	AV-CTR(MHZ)	AV-WID(MHZ)	AV-SL(DB)	LOX(MHZ)	HIX(MHZ)
-0.19	329.00632	329.00632	329.00632	0.00000	329.00632	0.00000	0.00	329.00632	329.00632
0.50	328.62201	335.67365	332.14783	7.05164	332.13892	6.97427	-13.93	328.62201	335.67365
1.00	328.53271	335.87646	332.20459	7.34375	332.18250	7.03427	-15.36	328.53271	335.87646
2.00	328.39551	336.05079	332.22815	7.65528	332.19725	7.02164	-17.93	328.39551	336.05079
3.00	328.30258	336.18185	332.24222	7.87927	332.21774	7.06073	-18.78	328.30258	336.18185
4.00	328.23093	336.27148	332.25122	8.04056	332.21729	7.07854	-20.49	328.23093	336.27148
5.00	328.15492	336.34387	332.25439	8.17695	332.21785	7.75111	-22.57	328.15492	336.34387
6.00	328.10852	336.40533	332.25693	8.29681	332.23159	7.77681	-23.64	328.10852	336.40533
10.00	327.93228	336.60025	332.26627	8.66797	332.22556	7.84256	-29.25	327.93228	336.60025
20.00	327.64206	336.90433	332.27319	9.26227	332.22385	7.86532	-41.20	327.64206	336.90433
30.00	327.45509	337.11609	332.28607	9.66002	332.22287	7.86667	-51.25	327.45609	337.11609
40.00	327.30377	337.26920	332.28552	9.96542	332.22287	7.86675	-54.26	327.30377	337.26920

BAND(MHZ)	329.200	335.200
LMIN(DB)	-0.19	
LMAX(DB)	0.26	
LDEL(DB)	0.44	
PMIN(DEG)	-2774.53	
PMAX(DEG)	2862.57	
PDEL(DEG)	5637.21	

File: 3DB3805A.DAT Passband Symmetry = 3.0 dB

PHONON CORPORATION

FILE=3ER8B05A.DAT 13:33:45 04-13-1998

PN_100832_835 FINAL_FUNCTIONAL TEMP:R FLIGHTS_3FUNCT /N WIDE_S21

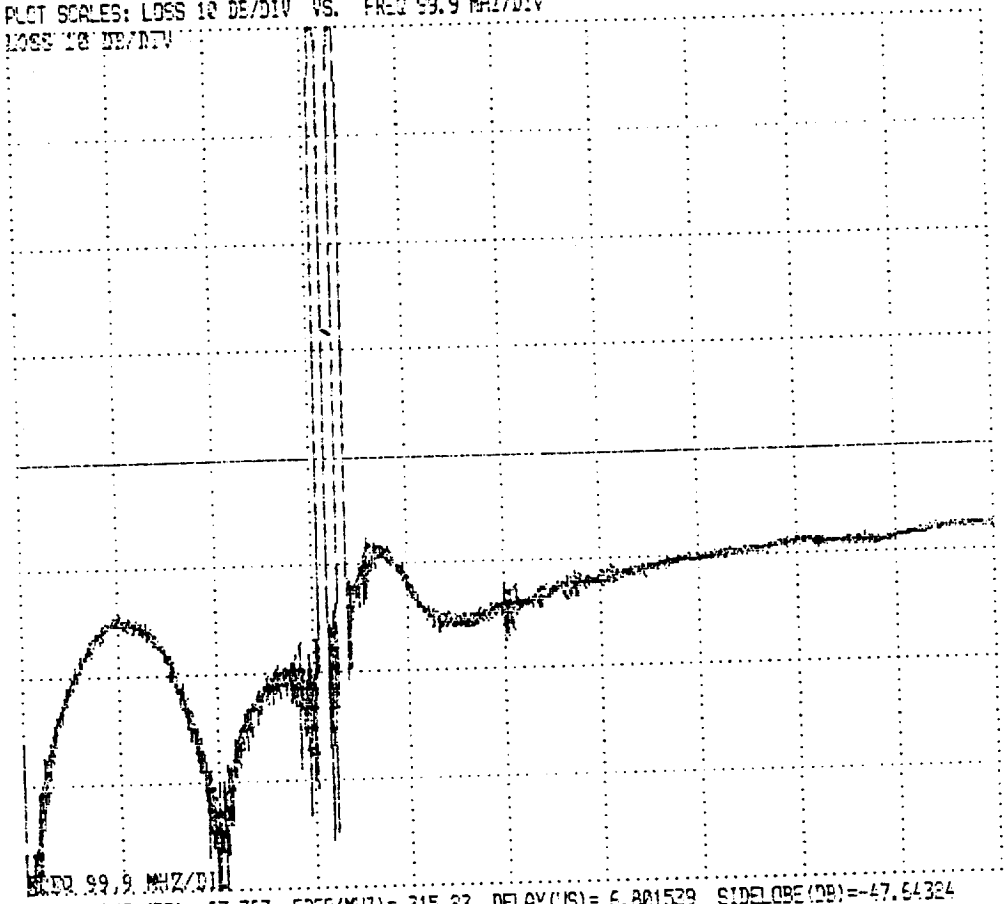
04-13-1998 HP8753,SSREF,SSREF

FREQUENCY(MHZ): CENTER= 500.5 WIDTH= 999 INCR.= .200135 SYSTEM BANDWIDTH= 999

REFERENCES: LOSS(DB)= 28.17971 PHASE(DEG)=-35781.24 DELAY(US)= 4.746447 SLOPE(US/MHZ)= 0

RMS ERRORS: LOSS(DB)= 10.17014 PHASE(DEG)= 5386.078

PLOT SCALES: LOSS 10 DB/DIV VS. FREQ 99.9 MHZ/DIV



PEAK: LEVEL(DB)= 27.767 FREQ(MHZ)= 315.23 DELAY(US)= 6.801529 SIDELOBE(DB)=-47.64324

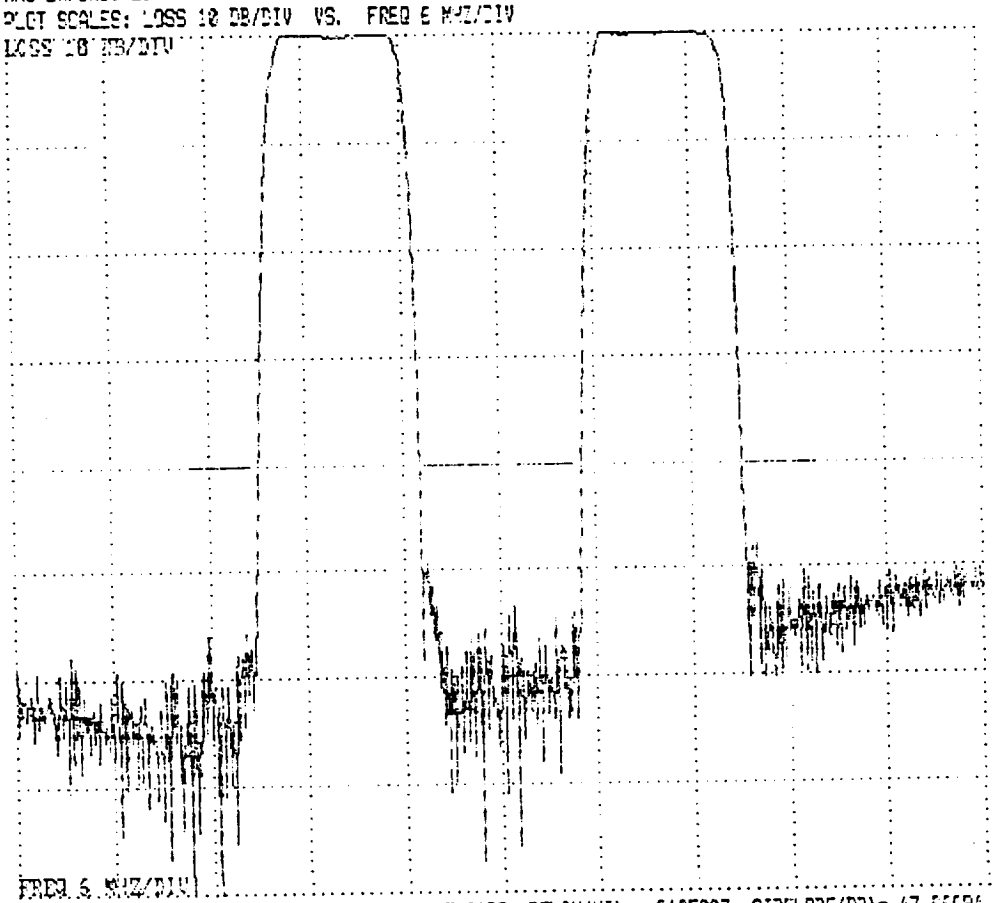
ENERGY: LEVEL(DB)= 28.36374 CENTER(MHZ)= 322.4436 WIDTH(MHZ)= 15.43894 SKEW(MHZ)= 244.1467

L(DB)	LO(MHZ)	HI(MHZ)	CTR(MHZ)	WID(MHZ)	AV-CTR(MHZ)	AV-WID(MHZ)	AV-SL(DB)	LOX(MHZ)	HIX(MHZ)
-0.41	315.22998	315.22998	315.22998	0.00000	315.22998	0.00000	0.00	315.22998	315.22998
0.50	308.80777	315.85580	312.33179	7.04803	312.30569	7.08038	-20.59	308.80777	335.67682
1.00	308.66116	315.95160	312.30540	7.29044	312.39368	7.25840	-20.67	308.66116	335.87952
2.00	308.48886	316.09079	312.28983	7.60193	312.31409	7.41426	-20.75	308.48886	336.05409
3.00	308.37244	316.19370	312.28308	7.82126	312.32089	7.65382	-20.88	308.37244	336.18170
4.00	308.28021	316.27734	312.27878	7.99713	312.32089	7.65382	-20.88	308.28021	336.27159
5.00	308.20428	316.34641	312.27533	8.14212	312.35947	7.72861	-20.92	308.20428	336.34338
6.00	308.13943	316.40738	312.27341	8.26794	312.32568	7.79185	-20.95	308.13943	336.40579
10.00	307.93753	316.59949	312.26849	8.66196	312.32803	7.85041	-20.98	307.93753	336.60031
20.00	307.61337	316.90942	312.26141	9.29585	312.32689	7.86751	-20.99	307.61337	336.92341
30.00	307.38837	317.11545	312.25189	9.72788	312.32901	7.87052	-20.99	307.38837	337.11774
40.00	307.21859	317.21341	312.21685	9.99472	312.32898	7.87079	-20.99	307.21859	337.27551

BAND(MHZ)	1.000	303.000	342.000	1000.000
LMIN(DB)	54.42	-0.41	47.23	
LMAX(DB)	90.91	75.47	57.29	
LDEL(DB)	36.49	75.88	10.06	
PMIN(DEG)	-9999.00	-9958.86	-8592.39	
PMAX(DEG)	-3323.16	5848.37	5721.97	
PDEL(DEG)	6675.84	15807.23	14314.37	

FILE: 3ER8B05A.DAT Out-of-band Rejection: PEAK= 47.2 dB WIDTH= 0.000 MHz

PHONON CORPORATION
FILE=3FRSB05A.DAT 13:34:05 04-13-1998
PN_100832_025 FINAL_FUNCTIONAL TEMP:R FLIGHTS_3FUNCT /N DUAL_SXX
04-13-1998 HP8753,SSREF,SSREF
FREQUENCY(MHZ): CENTER= 322.2 WIDTH= 60 INCR.= .1 SYSTEM BANDWIDTH= 60
REFERENCES: LOSS(DB)= 28.17971 PHASE(DEG)=-59658.5 DELAY(US)= 1.918512 SLOPE(US/MHZ)= 0
RMS ERRORS: LOSS(DB)= 27.06279 PHASE(DEG)= 3194.535
PLOT SCALES: LOSS 10 DB/DIV VS. FREQ 6 MHZ/DIV



PEAK: LEVEL(DB)= 27.74221 FREQ(MHZ)= 315.2195 DELAY(US)= .9435827 SIDELOBE(DB)=-47.66694
ENERGY: LEVEL(DB)= 28.25865 CENTER(MHZ)= 322.2747 WIDTH(MHZ)= 16.42825 SKEW(MHZ)=-8.309499E-03

L(DB)	LO(MHZ)	HI(MHZ)	CTR(MHZ)	WID(MHZ)	AV-CTR(MHZ)	AV-WID MHZ)	AV-SL(DB)	LOX(MHZ)	HIX(MHZ)
-0.44	315.21951	315.21951	315.21951	0.00000	315.21951	0 00000	0.00	315.21951	315.21951
0.50	308.80502	315.85373	312.32938	7.04871	312.39455	7 03224	-7.63	308.80502	335.67715
1.00	308.66208	315.94885	312.30548	7.28677	312.34991	7 27838	-7.94	308.66208	335.87811
2.00	308.48792	316.09103	312.28949	7.60312	312.31554	7 49118	-8.03	308.49792	336.05161
3.00	308.37082	316.19211	312.28145	7.82129	312.31897	7 60659	-8.07	308.37032	336.19246
4.00	308.27985	316.27728	312.27856	7.99744	312.32181	7 69789	-8.11	308.27985	336.27197
5.00	308.20428	316.34729	312.27579	8.14301	312.34088	7 73499	-8.11	308.20428	336.34427
6.00	308.13834	316.40790	312.27313	8.26956	312.33783	7 75210	-8.13	308.13834	336.40567
10.00	307.93753	316.59927	312.26840	8.66174	312.32735	7 84429	-8.13	307.93753	336.60049
20.00	307.61334	316.90869	312.26102	9.29535	312.32959	7 87789	-8.09	307.61334	336.90448
30.00	307.38849	317.11065	312.24957	9.72217	312.32907	7 87574	-8.05	307.38849	337.11618
40.00	307.21448	317.28218	312.22333	10.01770	312.32927	7 87979	-8.03	307.21448	337.28928

BAND(MHZ)	309.200	315.200	329.200	335.200
LMIN(DB)	-0.44	-0.42	-2.19	
LMAX(DB)	0.34	77.23	0.25	
LDEL(DB)	0.78	77.65	0.44	
PMIN(DEG)	402.44	-1034.73	-1366.98	
PMAX(DEG)	2247.28	1044.42	407.71	
PDEL(DEG)	1844.84	2079.15	1774.69	

FILE: 3FRSB05A.DAT Out-of-band Rejection: PEAK= 47.4 DB WIDTH= 0.000 MHz

PHONON CORPORATION
FILE: 3FR0805A.DAT (-SSCF)
PN_120932_825 FINAL_FUNCTIONAL TEMP:R FLIGHT5_3FUNCT /N DUAL_SXX
04-13-1999 HP8753,SSREF,SSREF,SSCF
REFERENCES: LOSS(DB)= 28.17971 PHASE(DEG)= -59559.5
DELAY(US)= 1.818512 SLOPE(US/MHZ)= 0

BANDPASS CHARACTERISTICS MEASUREMENT

FREQUENCY(MHZ)	LOSS(DB)	PHASE(DEG)
324.500	63.32	2957.15
325.360	55.75	3301.51
326.120	5.30	2614.37
327.880	-0.05	2084.25
311.640	0.14	1514.10
313.400	0.11	954.54
315.160	-0.42	415.00
316.920	20.47	-138.41
318.680	54.33	-344.62
320.440	58.23	-579.16
322.200	60.89	-444.70
323.960	61.72	-417.86
325.720	57.21	693.85
327.480	29.41	936.22
329.240	-0.03	295.65
331.000	-0.05	-121.48
332.760	-0.39	-859.23
334.520	-0.13	-1192.54
336.280	4.13	-1720.74
338.040	49.86	-2339.63
339.800	52.51	-1628.19

ELECTRICAL TEST DATA SHEET

AEROJET PART: 1331576-3 PHONON PART: 100825 SERIAL: B05

TESTED BY: 210 TITLE: Jeff Kuh DATE: 4/13/98 TIME: 2:30 pm

TEST: FINAL FUNCTIONAL

EQUIPMENT: HP 8753D SERIAL: 3410A04374 CAL DUE: 1/29/99

HP 3478A SERIAL: 2136A03127 CAL DUE: 7/7/98

PARAGRAPH REQ.	Q/ATP	REQUIREMENT TITLE	DATA		P/F
3.2.1.1	5.2.1	OPERATING TEMPERATURE	35.4	C	P
3.2.1.3	5.2.3	CENTER FREQUENCY &			
3.2.1.4		CENTER FREQUENCY STABILITY			
		LO: 312.035/312.365 MHz	312.286	MHz	P
		HI: 332.035/332.365 MHz	332.247	MHz	P
3.2.1.5	5.2.4	3 dB BANDWIDTH:			
		LO: 7.8/8.0 MHz	7.822	MHz	P
		HI: 7.8/8.0 MHz	7.878	MHz	P
3.2.1.6	5.2.5	PASSBAND SYMMETRY			
		LO: /0.5 dB	0.3	dB	P
		HI: /0.5 dB	0.0	dB	P
3.2.1.7	5.2.6	PASSBAND RIPPLE			
		309.2-315.2 MHz: /1.0 dB	0.8	dB	P
		329.2-335.2 MHz: /1.0 dB	0.4	dB	P
3.2.1.8	5.2.7	INSERTION LOSS			
		LO: 27.8/30.2 dB	28.4	dB	P
		HI: 27.8/30.2 dB	28.5	dB	P
3.2.1.9	5.2.8	INSERTION LOSS VARIATION			
		LO: -0.4/0.4 dB	0.2	dB	P
		HI: -0.4/0.4 dB	0.3	dB	P
3.2.1.10	5.2.9	AMPLITUDE BALANCE			
		LO,HI: /0.5 dB	0.1	dB	P
3.2.1.11	5.2.10	OUT-OF-BAND REJECTION			
		BAND	PEAK(dB)	WIDTH(MHz)	
		WIDE: 1-303,342-1000 MHz:	46.8	0.000	
		DUAL: 303.000-306.835, 317.565-326.835, 337.565-342.00 MHz:	47.7	0.000	
		PEAK: 35.0/ dB	46.8 dB		P
		WIDTH: /1.6 MHz		0.000 MHz	P
3.2.1.12	5.2.11	SHAPE FACTOR			
		LO: /1.30 Unitless	1.28	Unitless	P
		HI: /1.30 Unitless	1.27	Unitless	P
3.2.1.14	5.2.12	VSWR (RETURN LOSS)			
		309.2-315.2,329.2-335.2 MHz			
		DUAL S11: 7.5/ dB	10.0	dB	P
		DUAL S22: 7.5/ dB	8.6	dB	P
4.8.2	5.2.14	LIMITED FUNCTIONAL TESTS			
		CENTER FREQUENCY: -0.1/0.1 MHz	0	MHz	P
		3 dB BANDWIDTH: -0.16/0.16 MHz	0	MHz	P
		INSERTION LOSS: -0.5/0.5 dB	0	dB	P
NONE	5.2.15	DATA SHEET SUMMARY (PASS/FAIL)	P (DP)		

PHONON CORPORATION
7 HERMAN DRIVE
SIMSBURY, CT 06070

CAGE: 6Y358
TEL: 203-651-8211
FAX: 203-651-8618

PHONON CORPORATION

FILE=3AR8805A.DAT 12:32:04 04-13-1998

PN_100832_625 FINAL_FUNCTIONAL TEMP:R FLIGHT5_3FUNCT /N DUAL_SXY

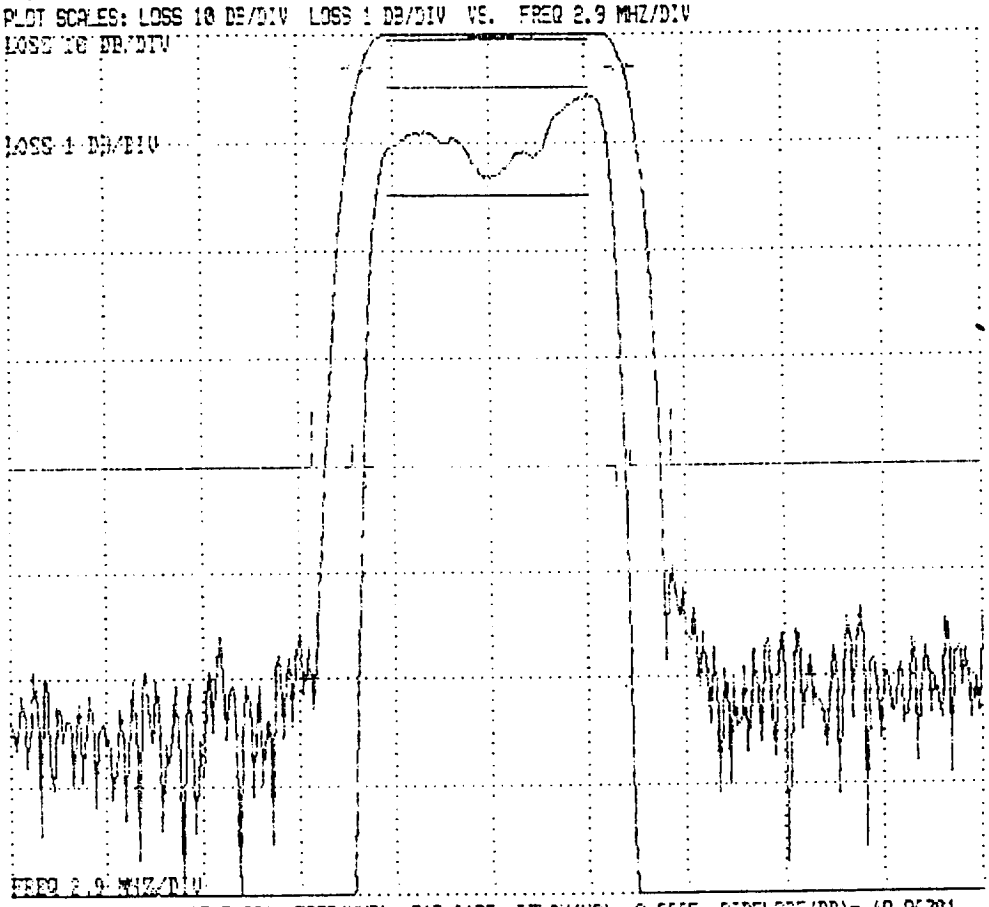
04-13-1998 HP8753,SSCF,SSFFIX,SSREF

FREQUENCY(MHZ): CENTER= 312.2 WIDTH= 29 INCR.= .1 SYSTEM BANDWIDTH= 6

REFERENCES: LOSS(DB)= 28.1857 PHASE(DEG)=-51412.69 DELAY(US)= 0 SLOPE(US/MHZ)= 0

RMS ERRORS: LOSS(DB)= .1980499 PHASE(DEG)= 1646.581

PLOT SCALES: LOSS 10 DB/DIV LOSS 1 DB/DIV VS. FREQ 2.9 MHZ/DIV



PEAK: LEVEL(DB)= 27.74021 FREQ(MHZ)= 315.2195 DELAY(US)=-2.6835 SIDELOBE(DB)=-49.96301

ENERGY: LEVEL(DB)= 28.34684 CENTER(MHZ)= 312.3291 WIDTH(MHZ)= 8.187827 SKEW(MHZ)=-6.529321E-02

L(DB)	LO(MHZ)	HI(MHZ)	CTR(MHZ)	WID(MHZ)	AV-CTR(MHZ)	AV-WID(MHZ)	AV-SL(DB)	LOX(MHZ)	HIX(MHZ)
-0.45	315.21951	315.21951	315.21951	0.00000	315.21951	0.00000	0.00	315.21951	315.21951
0.50	308.80275	315.85522	312.32898	7.25246	312.39465	7.03194	-14.09	308.80276	315.85522
1.00	308.66868	315.94985	312.30527	7.28118	312.34991	7.26843	-15.59	308.65868	315.94985
2.00	308.48721	316.09174	312.28949	7.60452	312.31564	7.50152	-17.42	308.48721	316.09174
3.00	308.37021	316.19269	312.28143	7.82248	312.31897	7.61709	-18.91	308.37021	316.19269
4.00	308.27936	316.27774	312.27955	7.99838	312.32181	7.70851	-20.64	308.27936	316.27774
5.00	308.20385	316.34769	312.27576	8.14383	312.34088	7.74567	-21.60	308.20385	316.34769
6.00	308.13797	316.40823	312.27310	8.27026	312.33783	7.80285	-23.75	308.13797	316.40823
10.00	307.93729	316.59943	312.25837	8.66220	312.32736	7.85512	-27.59	307.93729	316.59949
20.00	307.61316	316.90881	312.25099	9.29555	312.32959	7.88876	-40.10	307.61316	316.90581
32.00	307.38837	317.11075	312.24957	9.72238	312.32910	7.89052	-53.80	307.38837	317.11075
40.00	307.21439	317.23224	312.22333	10.01785	312.32907	7.89067	-59.87	307.21439	317.23224

BAND(MHZ)	309.220	315.200
LMIN(DB)	-0.42	
LMAX(DB)	0.34	
LDEL(DB)	0.76	
PMIN(DEG)	-2803.84	
PMAX(DEG)	2903.52	
PDEL(DEG)	5707.36	

File: 3AR8805A.DAT Passband S,xsetry = 0.3 dB

PHONON CORPORATION

FILE=3CR23059A.DAT 13:32:57 04-13-1998

PN_103932_B2S FINAL_FUNCTIONAL TEMP:R FLIGHTS_2FUNCT /N DUAL_S:X

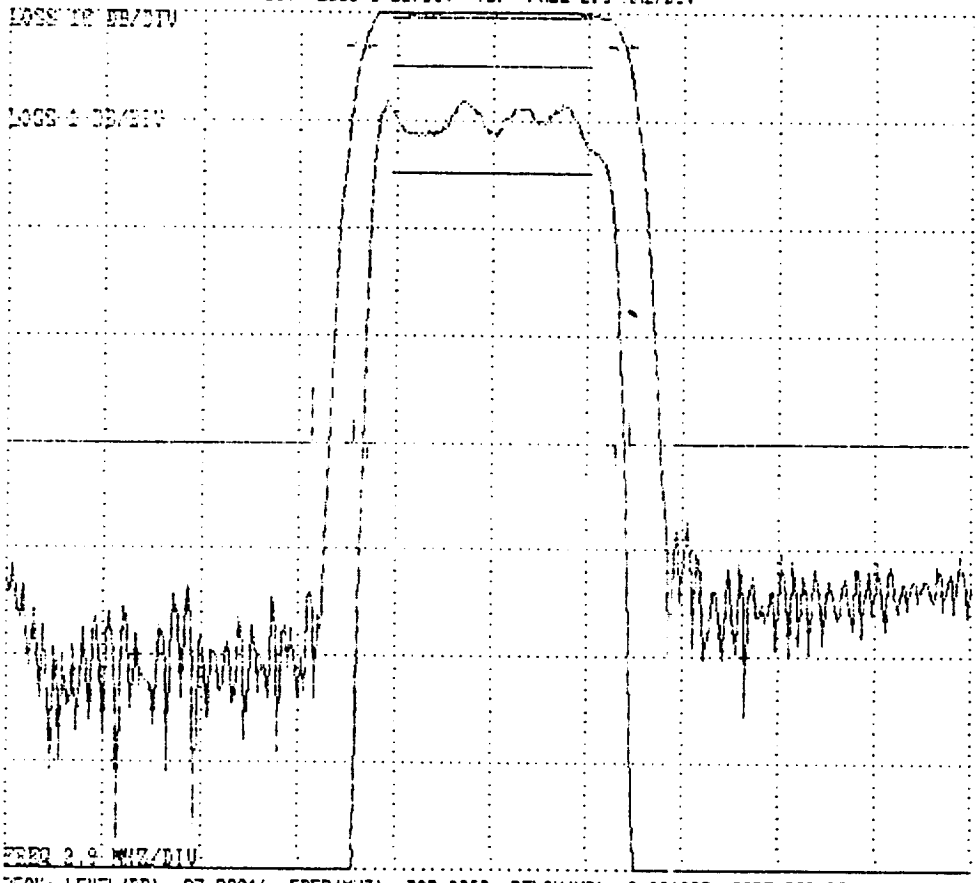
04-13-1998 HP8753,SSCF,SSFFIX,SSREF

FREQUENCY(MHZ): CENTER= 332.2 WIDTH= 99 INCR.= .1 SYSTEM BANDWIDTH= 6

REFERENCES: LOSS(DB)= 28.17373 PHASE(DEG)=-67056.02 DELAY(US)= 0 SLOPE(US/MHZ)= 0

RMS ERRORS: LOSS(DB)= .1074797 PHASE(DEG)= 1526.402

PLOT SCALES: LOSS 10 DB/DIV LOSS 1 DB/DIV VS. FREQ 2.9 MHZ/DIV



PEAK: LEVEL(DB)= 27.98014 FREQ(MHZ)= 329.0053 DELAY(US)=-2.664229 SIDELOBE(DB)=-47.52698

ENERGY: LEVEL(DB)= 28.3711 CENTER(MHZ)= 332.2229 WIDTH(MHZ)= 3.232573 SKEW(MHZ)= 1.550319E-02

L(DB)	LO(MHZ)	HI(MHZ)	CTR(MHZ)	WID(MHZ)	AV-CTR(MHZ)	AV-WID(MHZ)	AV-SL(DB)	LOX(MHZ)	HIX(MHZ)
-0.19	329.00632	329.00632	329.00632	0.00000	329.00632	0.00000	0.00	329.00632	329.00632
0.50	328.62201	335.67365	332.14783	7.05164	332.13392	6.97427	-13.93	328.62201	335.67365
1.00	328.53271	335.87646	332.20459	7.34375	332.18250	7.23427	-15.36	328.53271	335.87646
2.00	328.39551	336.06079	332.22815	7.66528	332.18725	7.52164	-17.93	328.39551	336.06079
3.00	328.30258	336.18185	332.24222	7.87927	332.21774	7.58073	-18.70	328.30258	336.18185
4.00	328.23093	336.27148	332.25122	8.04056	332.21729	7.57854	-20.49	328.23093	336.27148
5.00	328.15492	336.34387	332.25439	8.17895	332.21785	7.75111	-22.57	328.15492	336.34387
6.00	328.10852	336.40533	332.25693	8.29681	332.23169	7.77681	-23.64	328.10852	336.40533
10.00	327.93228	336.60025	332.26627	8.66797	332.22356	7.84256	-29.25	327.93228	336.60025
20.00	327.64206	336.90433	332.27319	9.26227	332.22305	7.85532	-41.20	327.64206	336.90433
30.00	327.45509	337.11609	332.28607	9.66002	332.22287	7.86667	-51.25	327.45509	337.11609
40.00	327.32377	337.26920	332.28650	9.96542	332.22287	7.86675	-54.26	327.32377	337.26920

BAND(MHZ)	329.200	335.200
LMIN(DB)	-0.19	
LMAX(DB)	0.25	
LDEL(DB)	0.44	
PMIN(DEG)	-2774.63	
PMAX(DEG)	2862.57	
PDEL(DEG)	5637.21	

File: 3CR23059.DAT Passband Symmetry = 3.0 dB

Channel 14 Bandpass Filter

SAW Filter (S/N: 1331576-4, S/N: B06)

ELECTRICAL TEST DATA SHEET

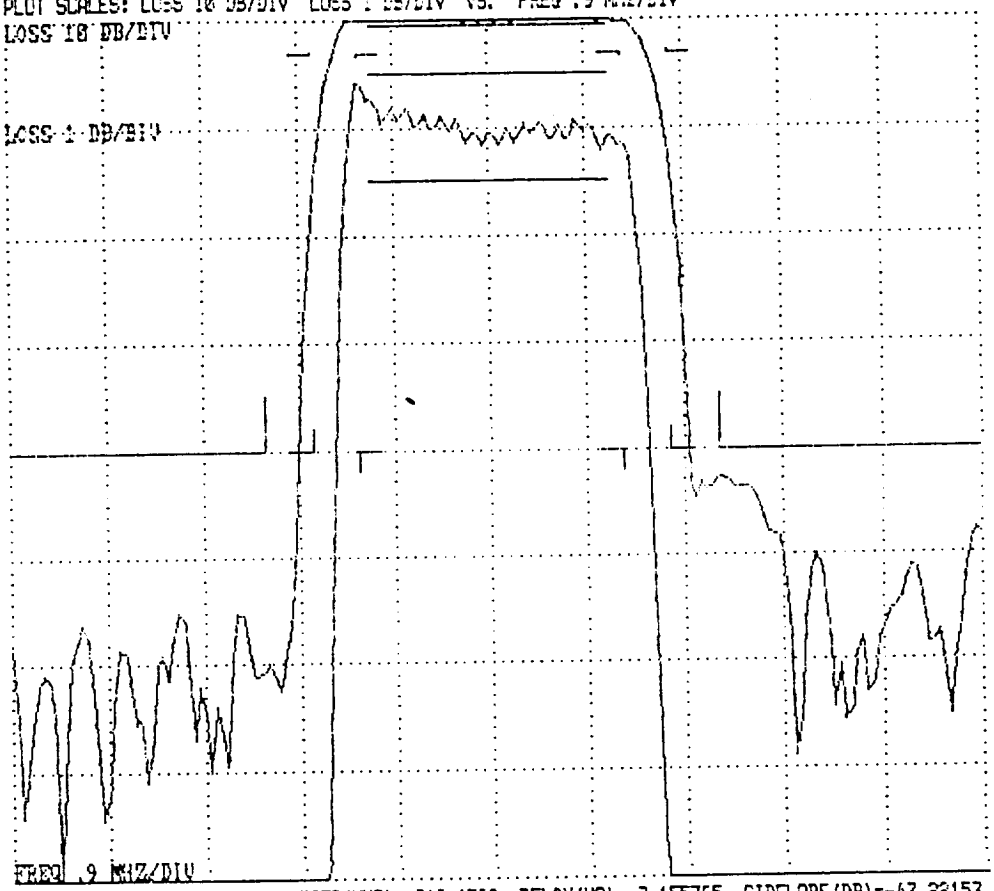
AEROJET PART: 1331576-4 PHONON PART: 100826 SERIAL: B06
TESTED BY: 210 TITLE: Tst Tech DATE: 4/13/99 TIME: 2:30pm
TEST: FINAL FUNCTIONAL
EQUIPMENT: HP 8753D SERIAL: 3410A04374 CAL DUE: 1/29/99
HP 3478A SERIAL: 2136A03127 CAL DUE: 7/ /98

PARAGRAPH REQ.	PARAGRAPH Q/ATP	REQUIREMENT TITLE	DATA		P/F
3.2.1.1	5.2.1	OPERATING TEMPERATURE	-5.1	C	P
3.2.1.3	5.2.3	CENTER FREQUENCY &			
3.2.1.4		CENTER FREQUENCY STABILITY			
		LO: 317.535/317.865 MHz	317.704	MHz	P
		HI: 326.535/326.865 MHz	326.653	MHz	P
3.2.1.5	5.2.4	3 dB BANDWIDTH:			
		LO: 2.8/3.0 MHz	2.935	MHz	P
		HI: 2.8/3.0 MHz	2.947	MHz	P
3.2.1.6	5.2.5	PASSBAND SYMMETRY			
		LO: /0.5 dB	0.0	dB	P
		HI: /0.5 dB	0.3	dB	P
3.2.1.7	5.2.6	PASSBAND RIPPLE			
		316.575-318.825 MHz: /1.0 dB	0.3	dB	P
		325.575-327.825 MHz: /1.0 dB	0.6	dB	P
3.2.1.8	5.2.7	INSERTION LOSS			
		LO: 27.8/30.2 dB	28.3	dB	P
		HI: 27.8/30.2 dB	28.5	dB	P
3.2.1.9	5.2.8	INSERTION LOSS VARIATION			
		LO: -0.4/0.4 dB	-0.2	dB	P
		HI: -0.4/0.4 dB	-0.2	dB	P
3.2.1.10	5.2.9	AMPLITUDE BALANCE			
		LO,HI: /0.5 dB	0.1	dB	P
3.2.1.11	5.2.10	OUT-OF-BAND REJECTION			
		BAND	PEAK(dB)	WIDTH(MHz)	
		WIDE: 1-313,331-1000 MHz:	46.5	0.000	
		DUAL: 313.000-315.585, 319.815-324.585, 328.815-331.0 MHz:	41.9	0.000	
		PEAK: 35.0/ dB	41.9 dB		P
		WIDTH: /0.6 MHz		0.000 MHz	P
3.2.1.12	5.2.11	SHAPE FACTOR			
		LO: /1.30 Unitless	1.24	Unitless	P
		HI: /1.30 Unitless	1.23	Unitless	P
3.2.1.14	5.2.12	VSWR (RETURN LOSS)			
		316.575-318.825,325.575-327.825 MHz			
		DUAL S11: 7.5/ dB	9.2	dB	P
		DUAL S22: 7.5/ dB	10.5	dB	P
4.8.2	5.2.14	LIMITED FUNCTIONAL TESTS			
		CENTER FREQUENCY: -0.1/0.1 MHz	0	MHz	P
		3 dB BANDWIDTH: -0.06/0.06 MHz	0	MHz	P
		INSERTION LOSS: -0.5/0.5 dB	0	dB	P
NONE	5.2.15	DATA SHEET SUMMARY (PASS/FAIL)	P (P)		

PHONON CORPORATION
7 HERMAN DRIVE
SIMSBURY, CT 06070

CAGE: 6Y858
TEL: 203-651-8211
FAX: 203-651-8618

PHONON CORPORATION
FILE=4AC8B06A.DAT 13:22:41 04-13-1998
PN_100834_826 FINAL_FUNCTIONAL TEMP:C FLIGHT5_3FUNCT /N DUAL_SXX
04-13-1998 HP8753,SSOF,SSFFIX,SSREF
FREQUENCY(MHZ): CENTER= 317.7 WIDTH= 9 INCR.= .05 SYSTEM BANDWIDTH= 2.25
REFERENCES: LOSS(DB)= 28.34658 PHASE(DEG)=-35021.98 DELAY(US)= 0 SLOPE(US/MHZ)= 0
RMS ERRORS: LOSS(DB)= .1056613 PHASE(DEG)= 743.8607
PLOT SCALES: LOSS 10 DB/DIV LOSS 1 DB/DIV VS. FREQ .9 MHZ/DIV



PEAK: LEVEL(DB)= 27.90615 FREQ(MHZ)= 316.4752 DELAY(US)=-3.155765 SIDELOBE(DB)=-43.22153
ENERGY: LEVEL(DB)= 28.50163 CENTER(MHZ)= 317.6854 WIDTH(MHZ)= 3.065326 SKEW(MHZ)= 2.690199E-02

L(DB)	LO(MHZ)	HI(MHZ)	CTR(MHZ)	WID(MHZ)	AV-CTR(MHZ)	AV-WID(MHZ)	AV-SL(DB)	LOX(MHZ)	HIX(MHZ)
-0.44	316.47623	316.47623	316.47623	0.00000	316.47623	0.00000	0.00	316.47623	316.47623
0.50	316.33850	319.02029	317.67938	2.68179	317.65863	2.70311	-13.98	316.33850	319.02029
1.00	316.30829	319.06775	317.68802	2.75946	317.67969	2.74455	-14.70	316.30829	319.06775
2.00	316.26990	319.13364	317.70178	2.86374	317.67920	2.81893	-16.49	316.26990	319.13364
3.00	316.23611	319.17135	317.70374	2.93524	317.68021	2.87576	-18.72	316.23611	319.17135
4.00	316.20871	319.20425	317.70648	2.99554	317.69101	2.89634	-19.93	316.20871	319.20425
5.00	316.18567	319.23145	317.70856	3.04578	317.68164	2.91466	-21.43	316.18567	319.23145
6.00	316.16534	319.25497	317.71014	3.08963	317.68872	2.92788	-22.98	316.16534	319.25497
10.00	316.10233	319.32709	317.71472	3.22476	317.68738	2.94550	-26.76	316.10233	319.32709
20.00	316.00040	319.43543	317.71841	3.43684	317.68646	2.95586	-37.40	316.00040	319.43543
30.00	315.93448	319.50015	317.71732	3.56567	317.68637	2.95783	-50.21	315.93448	319.50015
40.00	315.88867	319.53766	317.71317	3.64899	317.68634	2.95784	-51.08	315.88867	319.53766

BAND(MHZ) 316.575 318.825
LMIN(DB) -0.28
LMAX(DB) 0.21
LDEL(DB) 0.49
PMIN(DEG) -1259.60
PMAX(DEG) 1259.82
PDEL(DEG) 2519.61
File: 4AC8B06A.DAT Passband Symmetry = 0.0 dB

PHONON CORPORATION

FILE=4CC8B06A.DAT 13:23:26 04-13-1998

PN_100834_826 FINAL_FUNCTIONAL TEMP:C FLIGHT5_3FUNCT /N DUAL_SXX

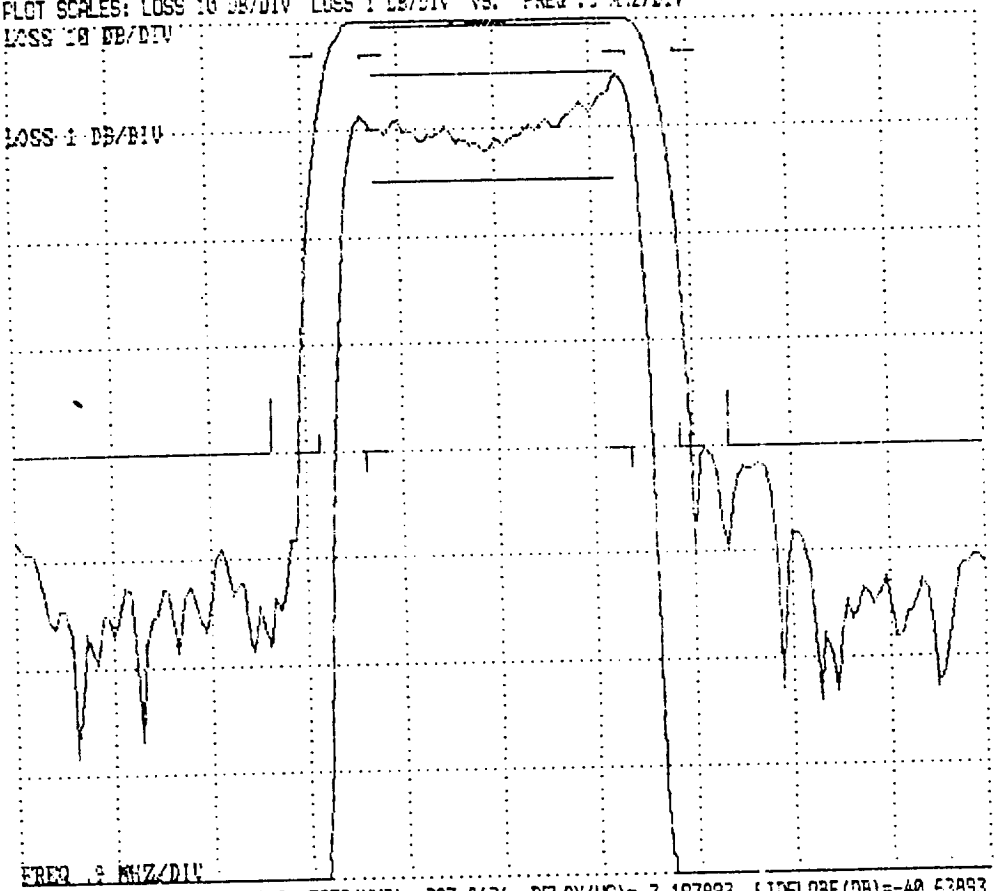
04-13-1998 HP8753,SSCF,SSFFIX,SSREF

FREQUENCY(MHZ): CENTER= 326.7 WIDTH= 9 INCR.= .05 SYSTEM BANDWIDTH= 2.25

REFERENCES: LOSS(DB)= 28.48105 PHASE(DEG)=-42819.73 DELAY(US)= 0 SLOPE(US/MHZ)= 0

RMS ERRORS: LOSS(DB)= .1414554 PHASE(DEG)= 742.8536

PLOT SCALES: LOSS 10 DB/DIV LOSS 1 DB/DIV VS. FREQ .9 MHZ/DIV



PEAK: LEVEL(DB)= 27.99216 FREQ(MHZ)= 327.8434 DELAY(US)=-3.197093 SIDELOBE(DB)=-40.63893

ENERGY: LEVEL(DB)= 28.61285 CENTER(MHZ)= 326.6589 WIDTH(MHZ)= 3.058135 SKEW(MHZ)=-2.370523E-02

L(DB)	LO(MHZ)	HI(MHZ)	CTR(MHZ)	WID(MHZ)	AV-CTR(MHZ)	AV-WID(MHZ)	AV-SL(DB)	LOX(MHZ)	HIX(MHZ)
-0.49	327.84335	327.84335	327.84335	0.00000	327.84335	0.00000	0.00	327.84335	327.84335
0.50	325.30325	328.01886	326.66107	2.71561	326.69052	2.71369	-13.81	325.30325	328.01886
1.00	325.25920	328.04913	326.65918	2.77994	326.66824	2.75789	-14.56	325.25920	328.04913
2.00	325.21570	328.09332	326.65451	2.87762	326.66895	2.83463	-16.37	325.21570	328.09332
3.00	325.17905	328.12640	326.65271	2.94736	326.66928	2.89366	-18.64	325.17905	328.12640
4.00	325.14993	328.15332	326.65161	3.00339	326.66934	2.93411	-21.48	325.14993	328.15332
5.00	325.12564	328.17627	326.65094	3.05063	326.66934	2.93411	-21.45	325.12564	328.17627
6.00	325.10443	328.19647	326.65045	3.09204	326.66934	2.93411	-21.42	325.10443	328.19647
10.00	325.03757	328.26093	326.64923	3.22336	326.66910	2.97013	-29.22	325.03757	328.26093
20.00	324.93097	328.36404	326.64752	3.43307	326.66891	2.97667	-41.09	324.93097	328.36404
30.00	324.86581	328.42267	326.64423	3.55685	326.66888	2.97701	-47.53	324.86581	328.42267
40.00	324.82788	328.46457	326.64624	3.63669	326.66888	2.97705	-49.47	324.82788	328.46457

BAND(MHZ)	325.575	327.825
LMIN(DB)	-0.43	
LMAX(DB)	0.22	
LDEL(DB)	0.66	
PMIN(DEG)	-1261.34	
PMAX(DEG)	1255.76	
PDEL(DEG)	2517.10	

File: 4CC8B06A.DAT Passband Symmetry = 0.3 dB

ELECTRICAL TEST DATA SHEET

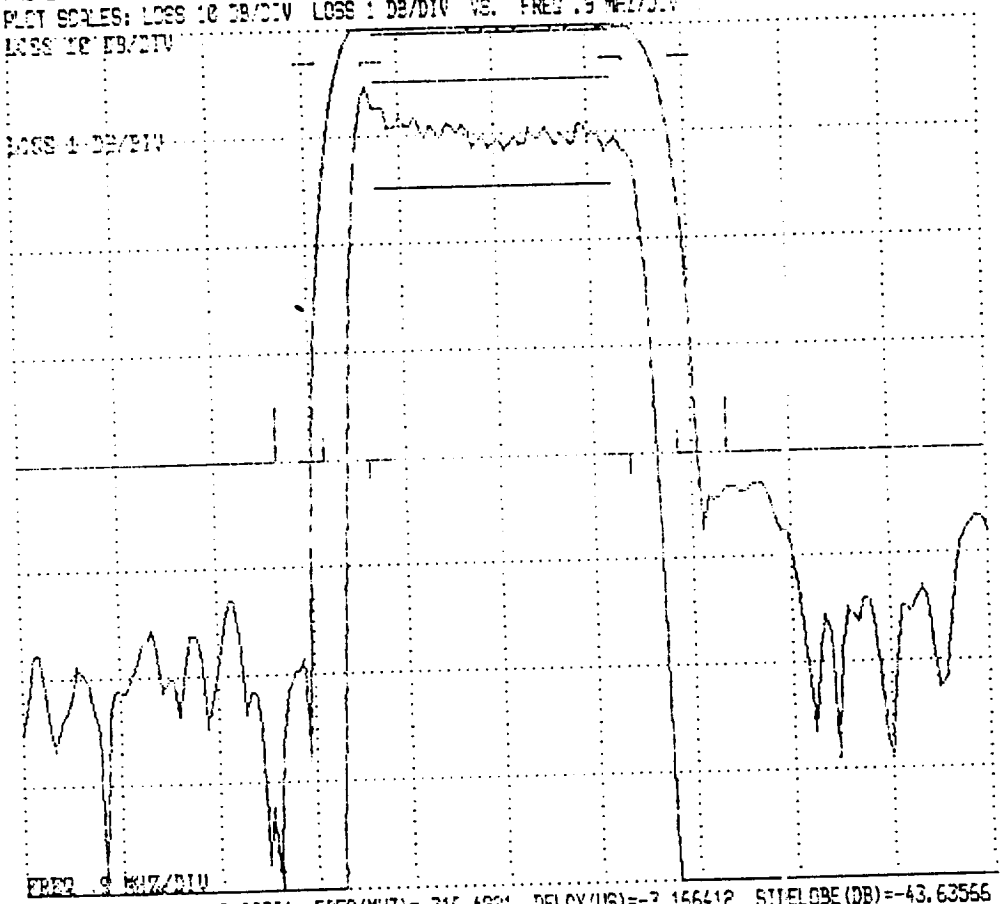
EROJET PART: 1331576-4 PHONON PART: 100826 SERIAL: B06
TESTED BY: 210 TITLE: Test Tech DATE: 4/13/99 TIME: 2:30pm
TEST: FINAL FUNCTIONAL
EQUIPMENT: HP 8753D SERIAL: 3410A04374 CAL DUE: 1/29/99
HP 3478A SERIAL: 2136A03127 CAL DUE: 7/7/98

PARAGRAPH REQ.	PARAGRAPH Q/ATP	REQUIREMENT TITLE	DATA		P/F
3.2.1.1	5.2.1	OPERATING TEMPERATURE	15.0	C	P
3.2.1.3	5.2.3	CENTER FREQUENCY &			
3.2.1.4		CENTER FREQUENCY STABILITY			
		LO: 317.535/317.865 MHz	317.713	MHz	P
		HI: 326.535/326.865 MHz	326.661	MHz	P
3.2.1.5	5.2.4	3 dB BANDWIDTH:			
		LO: 2.8/3.0 MHz	2.935	MHz	P
		HI: 2.8/3.0 MHz	2.948	MHz	P
3.2.1.6	5.2.5	PASSBAND SYMMETRY			
		LO: /0.5 dB	0.0	dB	P
		HI: /0.5 dB	0.3	dB	P
3.2.1.7	5.2.6	PASSBAND RIPPLE			
		316.575-318.825 MHz: /1.0 dB	0.4	dB	P
		325.575-327.825 MHz: /1.0 dB	0.6	dB	P
3.2.1.8	5.2.7	INSERTION LOSS			
		LO: 27.8/30.2 dB	28.5	dB	P
		HI: 27.8/30.2 dB	28.7	dB	P
3.2.1.9	5.2.8	INSERTION LOSS VARIATION			
		LO: -0.4/0.4 dB	0.0	dB	P
		HI: -0.4/0.4 dB	0.0	dB	P
3.2.1.10	5.2.9	AMPLITUDE BALANCE			
		LO,HI: /0.5 dB	0.1	dB	P
3.2.1.11	5.2.10	OUT-OF-BAND REJECTION			
		BAND	PEAK(dB)	WIDTH(MHz)	
		WIDE: 1-313,331-1000 MHz:	46.0	0.000	
		DUAL: 313.000-315.585, 319.815-324.585, 328.815-331.0 MHz:	40.8	0.000	
		PEAK: 35.0/ dB	40.8 dB		P
		WIDTH: /0.6 MHz		0.000 MHz	P
3.2.1.12	5.2.11	SHAPE FACTOR			
		LO: /1.30 Unitless	1.24	Unitless	P
		HI: /1.30 Unitless	1.23	Unitless	P
3.2.1.14	5.2.12	VSWR (RETURN LOSS)			
		316.575-318.825,325.575-327.825 MHz			
		DUAL S11: 7.5/ dB	8.9	dB	P
		DUAL S22: 7.5/ dB	10.6	dB	P
4.8.2	5.2.14	LIMITED FUNCTIONAL TESTS			
		CENTER FREQUENCY: -0.1/0.1 MHz	0.002	MHz	P
		3 dB BANDWIDTH: -0.06/0.06 MHz	±0.002	MHz	P
		INSERTION LOSS: -0.5/0.5 dB	±0.2	dB	P
NONE	5.2.15	DATA SHEET SUMMARY (PASS/FAIL)	P (PP)		

PHONON CORPORATION
7 HERMAN DRIVE
SIMSBURY, CT 06070

CAGE: 6Y858
TEL: 203-651-6211
FAX: 203-651-8618

PHONON CORPORATION
FILE=4AR8306A.DAT 13:35:13 04-13-1998
PN_1000834_626 FINAL_FUNCTIONAL TEMP:R FLIGHT5_3FUNCT /N DUAL_SYX
04-13-1998 HP8753,SSCF,SSFFIX,SSREF
FREQUENCY(MHZ): CENTER= 317.7 WIDTH= 9 INCR.= .05 SYSTEM BANDWIDTH= 3.35
REFERENCES: LOSS(DB)= 29.53718 PHASE(DEG)=-15789.62 DELAY(US)= 0 SLOPE(US/MHZ)= 0
RMS ERRORS: LOSS(DB)= .1046016 PHASE(DEG)= 742.9054
PLOT SCALES: LOSS 10 DB/DIV LOSS 1 DB/DIV VS. FREQ .9 MHZ/DIV



PEAK: LEVEL(DB)= 28.06354 FREQ(MHZ)= 315.4921 DELAY(US)=-3.156412 SIDELOBE(DB)=-43.63566
ENERGY: LEVEL(DB)= 28.69265 CENTER(MHZ)= 317.6954 WIDTH(MHZ)= 3.064858 SKEW(MHZ)= 2.691343E-02

L(DB)	LO(MHZ)	HI(MHZ)	CTR(MHZ)	WID(MHZ)	AV-CTR(MHZ)	AV-WID(MHZ)	AV-SL(DB)	LOX(MHZ)	HIX(MHZ)
-0.47	316.49207	316.49207	316.49207	0.00000	316.49207	0.00000	0.00	316.49207	316.49207
0.50	316.34662	319.02771	317.68716	2.68109	317.65970	2.70224	-13.98	316.34662	319.02771
1.00	316.32028	319.07651	317.69839	2.75623	317.68124	2.74477	-14.72	316.32028	319.07651
2.00	316.27881	319.14245	317.71063	2.86365	317.68204	2.81809	-15.48	316.27881	319.14245
3.00	316.24524	319.18033	317.71277	2.93509	317.68460	2.87452	-18.70	316.24524	319.18033
4.00	316.21799	319.21365	317.71582	2.99567	317.69617	2.89662	-20.01	316.21799	319.21365
5.00	316.19504	319.24063	317.71783	3.04559	317.68759	2.91330	-21.37	316.19504	319.24063
6.00	316.17499	319.26413	317.71954	3.08914	317.69531	2.92777	-23.08	316.17499	319.26413
10.00	316.11234	319.33645	317.72440	3.22412	317.69513	2.94514	-26.88	316.11234	319.33645
20.00	316.01151	319.44553	317.72852	3.43402	317.69534	2.95611	-37.62	316.01151	319.44553
30.00	315.94724	319.50726	317.72723	3.56003	317.69540	2.95703	-50.42	315.94724	319.50726
40.00	315.90355	319.54703	317.72482	3.64453	317.69540	2.95703	-50.36	315.90355	319.54703

BAND(MHZ) 316.575 318.825
LMIN(DB) -0.25
LMAX(DB) 0.19
LDEL(DB) 0.45
PMIN(DEG) -1259.27
PMAX(DEG) 1260.49
PDEL(DEG) 2519.75
File: 4AR8306A.DAT Passband Symmetry = 0.0 dB

PHONON CORPORATION

FILE=4CRE805A.DAT 13:36:05 04-13-1998

PN_100934_S05 FINAL_FUNCTIONAL TEMP:R FLIGHTS_2FUNCT /N DUAL_SXX

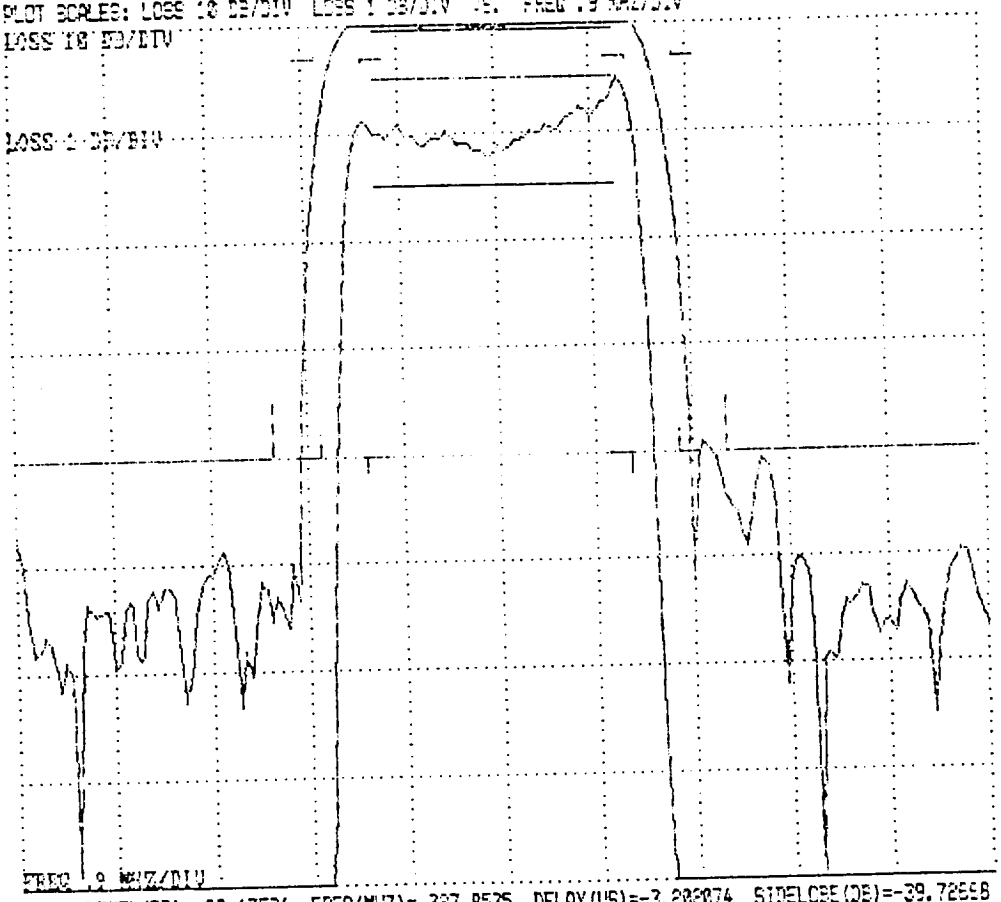
04-13-1998 HS8753,SSCF,SSFFIX,SSREF

FREQUENCY(MHZ): CENTER= 326.7 WIDTH= 9 INCR.= .05 SYSTEM BANDWIDTH= 2.25

REFERENCES: LOSS(DB)= 28.67517 PHASE(DEG)=-24165.35 DELAY(US)= 0 SLOPE(US/MHZ)= 0

RMS ERRORS: LOSS(DB)= .1355696 PHASE(DEG)= 742.8497

PLOT SCALES: LOSS 10 DB/DIV LOSS 1 DB/DIV VS. FREQ .9 MHZ/DIV



PEAK: LEVEL(DB)= 28.17524 FREQ(MHZ)= 327.8535 DELAY(US)=-3.208074 SIDELOBE(DB)=-39.72998

ENERGY: LEVEL(DB)= 28.80373 CENTER(MHZ)= 326.6774 WIDTH(MHZ)= 3.0691 SKEW(MHZ)=-2.408932E-02

L(DB)	LO(MHZ)	HI(MHZ)	CTR(MHZ)	WID(MHZ)	AV-CTR(MHZ)	AV-WID(MHZ)	AV-SL(DB)	LOX(MHZ)	HIX(MHZ)
-0.50	327.85355	327.85355	327.85355	0.00000	327.85355	0.00000	0.00	327.85355	327.85355
0.50	325.31168	328.02820	326.66992	2.71652	325.69141	2.71592	-13.81	325.31168	328.02820
1.00	325.27740	328.05872	326.66805	2.78131	325.68994	2.80029	-15.44	325.27740	328.05872
2.00	325.22391	328.10220	326.66305	2.87830	325.68765	2.85823	-17.44	325.22391	328.10220
3.00	325.18715	328.13522	326.66119	2.94806	326.67361	2.89561	-18.51	325.18715	328.13522
4.00	325.15805	328.16183	326.65994	3.00378	326.68481	2.91778	-19.90	325.15805	328.16183
5.00	325.13379	328.18460	326.65918	3.05081	326.67514	2.93629	-21.42	325.13379	328.18460
6.00	325.11252	328.20468	326.65860	3.09215	326.68201	2.94957	-22.98	325.11252	328.20458
10.00	325.04550	328.26895	326.65717	3.22336	326.67588	2.97254	-29.18	325.04550	328.26886
20.00	324.93866	328.37189	326.65527	3.43323	326.67728	2.97913	-41.81	324.93866	328.37189
30.00	324.87255	328.43472	326.65369	3.56207	326.67721	2.97948	-47.40	324.87265	328.43472
40.00	324.83682	328.46732	326.65207	3.63049	326.67734	2.97952	-49.31	324.83682	328.46840

BAND(MHZ)	325.575	327.825
LMIN(DB)	-0.40	
LMAX(DB)	0.23	
LDEL(DB)	0.63	
PMIN(DEG)	-1260.84	
PMAX(DEG)	1256.31	
PDEL(DEG)	2517.15	

File: 4CRE805A.DAT Passband Symmetry = 0.3 dB

PHONON CORPORATION

FILE=4ERSB05A.DAT 13:35:53 04-13-1998

PN 100834_005 FINAL_FUNCTIONAL TEMP:R FLIGHTS_3FUNCT /N WIDE_S01

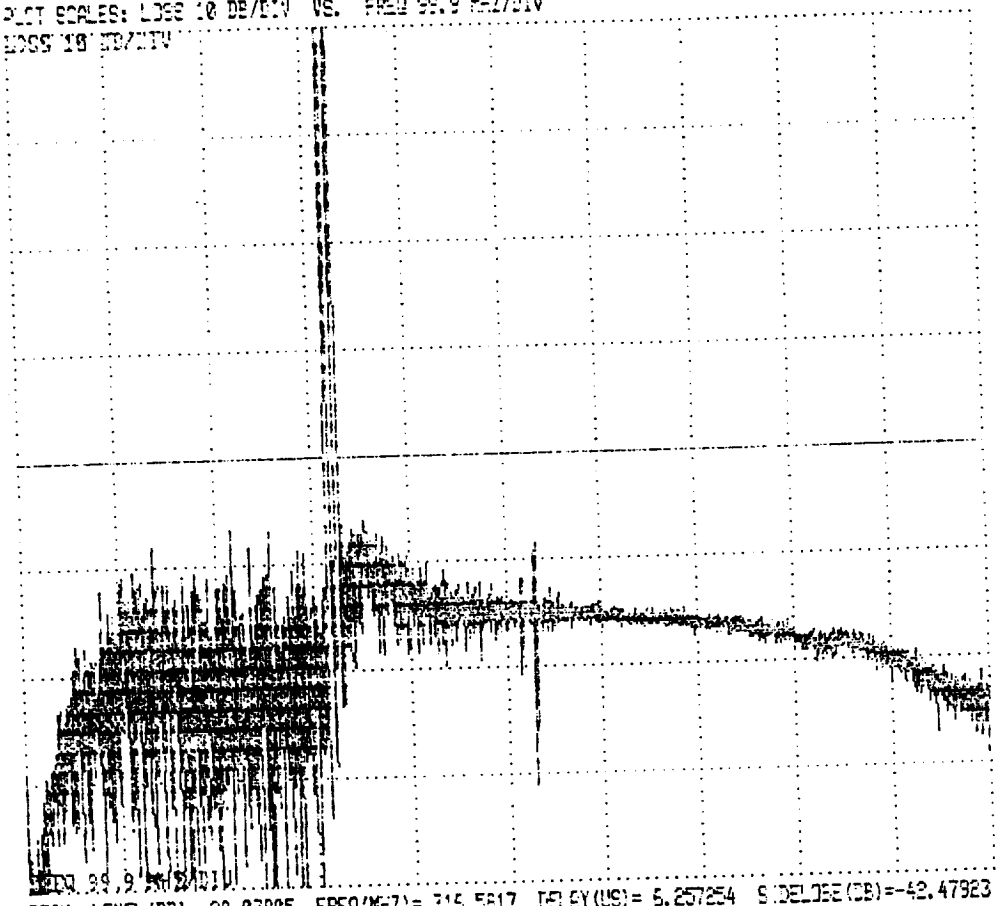
04-13-1998 HP8753,SSREF,SSREF

FREQUENCY(MHZ): CENTER= 502.5 WIDTH= 999 INCR.= .200125 SYSTEM BANDWIDTH= 999

REFERENCES: LOSS(DB)= 28.60817 PHASE(DEG)= 5878.675 DELAY(US)= 4.709125 SLOPE(US/MHZ)= 0

RMS ERRORS: LOSS(DB)= 7.752222 PHASE(DEG)= 11945.21

PLOT SCALES: LOSS 10 DB/DIV VS. FREQ 99.9 MHZ/DIV



PEAK: LEVEL(DB)= 29.02805 FREQ(MHZ)= 315.5817 DELAY(US)= 5.257254 SLOPE(DB)=-42.47923

ENERGY: LEVEL(DB)= 28.75359 CENTER(MHZ)= 322.1881 WIDTH(MHZ)= 6.1274.1 SKEW(MHZ)= 320.8909

L(DB)	LO(MHZ)	HI(MHZ)	CTR(MHZ)	WID(MHZ)	AV-CTR(MHZ)	AV-WID(MHZ)	AV-SL(DB)	LOX(MHZ)	HIX(MHZ)
-2.57	316.58173	316.58173	316.58173	0.00000	315.58173	0.00000	0.00	316.58173	316.58173
0.50	316.33481	319.03723	317.68604	2.70242	317.74175	2.74450	-24.95	316.58173	328.02335
1.00	316.31265	319.08710	317.69989	2.77444	317.74175	2.74460	-24.95	316.58173	328.05945
2.00	316.27362	319.15042	317.71204	2.87680	317.66190	2.90654	-25.18	316.27362	328.18545
3.00	316.23511	319.18854	317.71234	2.95242	317.66190	2.90664	-25.18	316.23511	328.13773
4.00	316.20602	319.21634	317.71118	3.01031	317.66190	2.90554	-25.18	316.20602	328.16152
5.00	316.18243	319.23914	317.71078	3.05670	317.70251	2.98424	-25.29	316.18243	328.17831
6.00	316.16321	319.25980	317.71149	3.09659	317.70251	2.98424	-25.29	316.16321	328.19077
10.00	316.10938	319.32845	317.71893	3.21909	317.70251	2.98424	-25.29	316.10938	328.24057
20.00	316.04156	319.44534	317.74347	3.40378	317.69504	3.00471	-25.32	316.04156	328.35503
30.00	315.97651	319.52631	317.75156	3.54953	317.69504	3.00471	-25.32	315.97621	328.48012
40.00	315.91202	319.60727	317.75964	3.69525	317.69504	3.00471	-25.32	315.91202	328.59729

BAND(MHZ)	1.000	313.000	331.000	1000.000
LMIN(DB)	46.57	-0.48	45.04	
LMAX(DB)	103.75	73.75	71.20	
LDEL(DB)	57.18	74.22	25.16	
PMIN(DEG)	-9999.00	1434.38	-9999.00	
PMAX(DEG)	3741.80	5042.78	5085.67	
PDEL(DEG)	13740.80	3608.41	15085.67	

FILE: 4ERSB05A.DAT Out-of-band Rejection: PEAK= 46.0 dB WIDTH= 0.000 MHz

PHONON CORPORATION

FILE=4FRBB06A.DAT 13:37:14 04-13-1998

PN_102934_005 FINAL_FUNCTIONAL TEMP:R FLIGHTS_PFUNCT /N DUAL_5XX

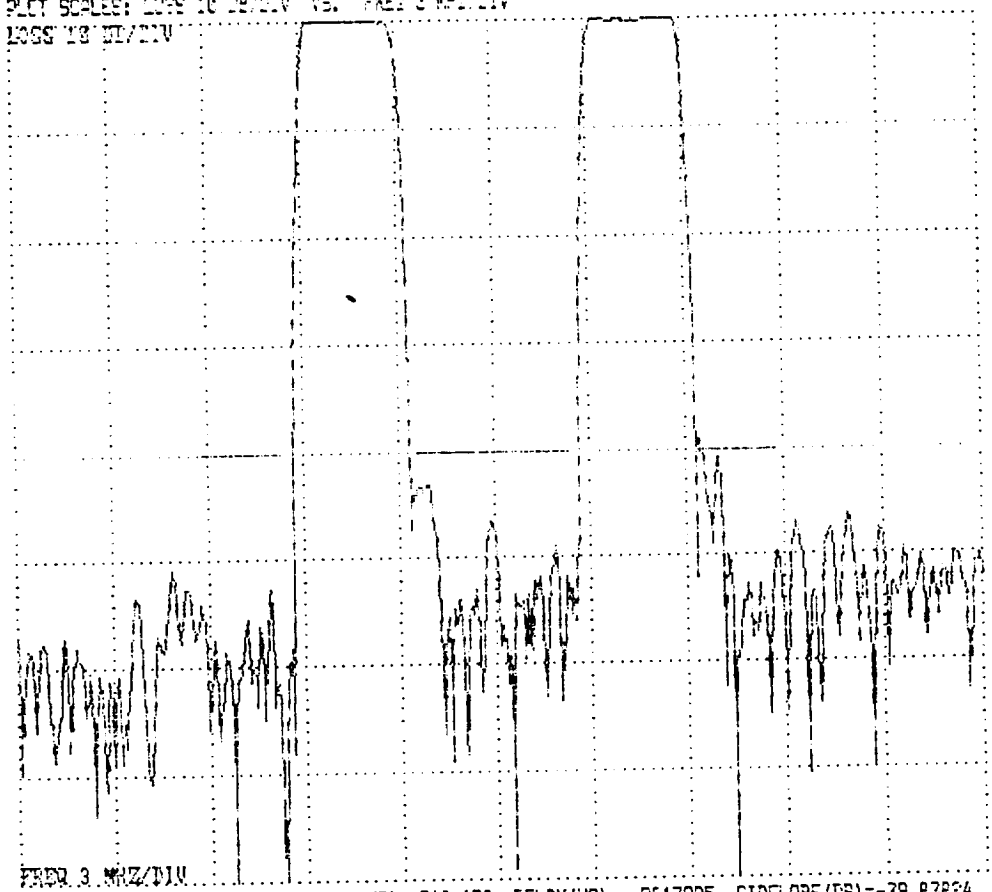
04-13-1998 HP8752,SSREF,SSREF

FREQUENCY(MHZ): CENTER= 322.2 WIDTH= 30 INCR.= .05 SYSTEM BANDWIDTH= 30

REFERENCES: LOSS(DB)= 28.58617 PHASE(DEG)=-30964.85 DELAY(US)= 2.25424 SLOPE(US/MHZ)= 0

RMS ERRORS: LOSS(DB)= 33.88506 PHASE(DEG)= 1337.289

PLOT SCALES: LOSS 10 DB/DIV VS. FREQ 3 MHZ/DIV



PEAK: LEVEL(DB)= 28.06395 FREQ(MHZ)= 316.492 DELAY(US)= .9517995 SIDELOBE(DB)=-39.83824

ENERGY: LEVEL(DB)= 28.7472 CENTER(MHZ)= 322.1321 WIDTH(MHZ)= 5.133051 SKEW(MHZ)= .1088736

L(DB)	LO(MHZ)	HI(MHZ)	CTR(MHZ)	WID(MHZ)	AV-CTR(MHZ)	AV-WID(MHZ)	AV-SL(DB)	LOX(MHZ)	HIX(MHZ)
-0.54	316.49203	316.49203	316.49203	0.00000	316.49203	0.00000	0.00	316.49203	316.49203
0.50	316.34299	319.03531	317.68915	2.69232	317.65970	2.74550	-9.33	316.24299	320.03371
1.00	316.31552	319.08206	317.69934	2.76544	317.68124	2.78972	-9.38	316.31662	320.05515
2.00	316.27643	319.14584	317.71112	2.86942	317.68204	2.85322	-9.47	316.27643	320.09964
3.00	316.24323	319.18283	317.71301	2.93961	317.68460	2.92055	-9.54	316.24323	320.13218
4.00	316.21625	319.21554	317.71594	2.99929	317.68917	2.94300	-9.56	316.21625	320.16016
5.00	316.19257	319.24234	317.71756	3.04877	317.68759	2.95995	-9.58	316.19357	320.18214
6.00	316.17368	319.26569	317.71967	3.09201	317.69531	2.97465	-9.59	316.17368	320.20334
10.00	316.11139	319.33746	317.72443	3.22687	317.69513	2.99230	-9.59	316.11139	320.25788
20.00	316.01095	319.44602	317.72852	3.43512	317.69531	3.00244	-9.58	316.01095	320.37134
30.00	315.94587	319.50754	317.72720	3.56067	317.69540	3.00438	-9.56	315.94587	320.43429
40.00	315.90237	319.54736	317.72485	3.64499	317.69540	3.00439	-9.54	315.90237	320.47831

BAND(MHZ)	316.575	318.825	325.575	327.825
LMIN(DB)	-0.32	-0.06	-0.32	
LMAX(DB)	0.12	78.98	0.30	
LDEL(DB)	0.45	79.03	0.63	
PMIN(DEG)	349.78	-466.00	-401.84	
PMAX(DEG)	1234.81	752.64	490.59	
PDEL(DEG)	885.03	1218.64	892.43	

FILE: 4FRBB06A.DAT Out-of-band Rejection: PEAK= 40.8 dB WIDTH= 0.000 MHz

PHONON CORPORATION
FILE: 4FR8B069.DAT (+99DF)
PV_100934_926 FINAL_FUNCTIONAL TEMP:R FLIGHTS_3FUNCT /N DUAL_9XX
04-13-1999 HP8753,99REF,99REF,99DF
REFERENCES: LOSS(DB)= 28.68817 PHASE(DEG)= -88864.25
DELAY(NS)= 2.86434 SLOPE(NS/MHZ)= 0

BANDPASS CHARACTERISTICS MEASUREMENT

FREQUENCY(MHZ)	LOSS(DB)	PHASE(DEG)
315.300	58.14	1893.14
315.720	59.72	1311.94
316.440	-2.39	1897.56
317.160	-3.09	1308.65
317.880	-3.03	719.23
318.600	-0.02	489.68
319.320	2.99	154.91
320.040	43.31	-852.58
320.760	59.38	-874.22
321.480	55.09	-357.35
322.200	47.71	-291.91
322.920	54.33	-373.37
323.640	58.11	55.53
324.360	50.06	337.64
325.080	7.64	573.91
325.800	0.81	-90.63
326.520	3.22	113.57
327.240	0.82	-175.39
327.960	-0.17	-486.35
328.680	40.83	-505.63
329.400	58.44	-519.05

ELECTRICAL TEST DATA SHEET

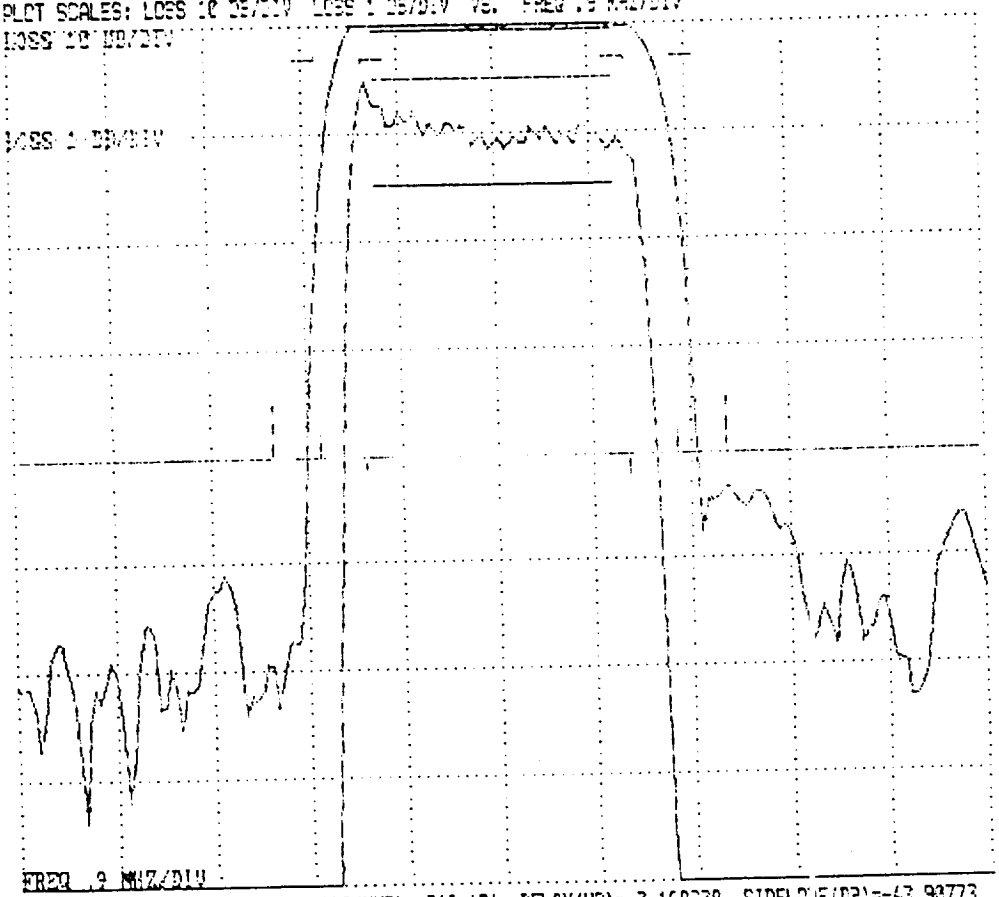
AEROJET PART: 1331576-4 PHONON PART: 100826 SERIAL: B06
TESTED BY: 210 TITLE: Test Tech DATE: 4/13/99 TIME: 2:30pm
TEST: FINAL FUNCTIONAL
EQUIPMENT: HP 8753D SERIAL: 3410A04374 CAL DUE: 1/29/99
HP 3478A SERIAL: 2136A03127 CAL DUE: 7/7/98

PARAGRAPH REQ.	Q/ATP	REQUIREMENT TITLE	DATA		P/F
3.2.1.1	5.2.1	OPERATING TEMPERATURE	35.4	C	P
3.2.1.3	5.2.3	CENTER FREQUENCY &			
3.2.1.4		CENTER FREQUENCY STABILITY			
		LO: 317.535/317.865 MHz	317.714	MHz	P
		HI: 326.535/326.865 MHz	326.660	MHz	P
3.2.1.5	5.2.4	3 dB BANDWIDTH:			
		LO: 2.8/3.0 MHz	2.934	MHz	P
		HI: 2.8/3.0 MHz	2.947	MHz	P
3.2.1.6	5.2.5	PASSBAND SYMMETRY			
		LO: /0.5 dB	0.0	dB	P
		HI: /0.5 dB	0.3	dB	P
3.2.1.7	5.2.6	PASSBAND RIPPLE			
		316.575-318.825 MHz: /1.0 dB	0.4	dB	P
		325.575-327.825 MHz: /1.0 dB	0.6	dB	P
3.2.1.8	5.2.7	INSERTION LOSS			
		LO: 27.8/30.2 dB	28.8	dB	P
		HI: 27.8/30.2 dB	28.9	dB	P
3.2.1.9	5.2.8	INSERTION LOSS VARIATION			
		LO: -0.4/0.4 dB	0.2	dB	P
		HI: -0.4/0.4 dB	0.2	dB	P
3.2.1.10	5.2.9	AMPLITUDE BALANCE			
		LO,HI: /0.5 dB	0.1	dB	P
3.2.1.11	5.2.10	OUT-OF-BAND REJECTION			
		BAND	PEAK(dB)	WIDTH(MHz)	
		WIDE: 1-313,331-1000 MHz:	46.1	0.000	
		DUAL: 313.000-315.585, 319.815-324.585, 328.815-331.0 MHz:	40.8	0.000	
		PEAK: 35.0/ dB	40.8 dB		P
		WIDTH: /0.6 MHz		0.000 MHz	P
3.2.1.12	5.2.11	SHAPE FACTOR			
		LO: /1.30 Unitless	1.24	Unitless	P
		HI: /1.30 Unitless	1.23	Unitless	P
3.2.1.14	5.2.12	VSWR (RETURN LOSS)			
		316.575-318.825,325.575-327.825 MHz			
		DUAL S11: 7.5/ dB	8.7	dB	P
		DUAL S22: 7.5/ dB	10.7	dB	P
4.8.2	5.2.14	LIMITED FUNCTIONAL TESTS			
		CENTER FREQUENCY: -0.1/0.1 MHz	0	MHz	P
		3 dB BANDWIDTH: -0.06/0.06 MHz	0	MHz	P
		INSERTION LOSS: -0.5/0.5 dB	0	dB	P
NONE	5.2.15	DATA SHEET SUMMARY (PASS/FAIL)	P (DP)		

PHONON CORPORATION
7 HERMAN DRIVE
SIMSBURY, CT 06070

CAGE: 6Y858
TEL: 203-651-0211
FAX: 203-651-8618

PHONON CORPORATION
FILE=40MB806A.DAT 13:47:44 24-12-1998
PN_100334_B06 FINAL_FUNCTIONAL TEMP:H FLIGHTS_2FUNCT /N DUAL_5XX
24-12-1998 HP8753,8SOF,8SFFIX,8SFEF
FREQUENCY(MHZ): CENTER= 317.7 WIDTH= 9 INCR.= .05 SYSTEM BANDWIDTH= 9.25
REFERENCES: LOSS(DB)= 28.77556 PHASE(DEG)= 4799.339 DELAY(US)= 0 SLOPE(US/MHZ)= 0
RMS ERRORS: LOSS(DB)= .1274399 PHASE(DEG)= 742.9572
PLOT SCALES: LOSS 10 DB/DIV LOSS 1 DB/DIV VS. FREQ .9 MHZ/DIV



PEAK: LEVEL(DB)= 28.29152 FREQ(MHZ)= 316.494 DELAY(US)=-3.168838 SIDELOBE(DB)=-43.90773
ENERGY: LEVEL(DB)= 28.93105 CENTER(MHZ)= 317.6952 WIDTH(MHZ)= 3.063559 SKEW(MHZ)= 2.820532E-02

L(DB)	LO(MHZ)	HI(MHZ)	CTR(MHZ)	WID(MHZ)	AV-CTR(MHZ)	AV-WID(MHZ)	AV-SL(DB)	LOX(MHZ)	HIX(MHZ)
-0.49	316.49399	316.49399	316.49399	0.00002	316.49399	0.00000	0.00	316.49399	316.49399
0.50	316.34659	319.02777	317.68719	2.68118	317.65981	2.71249	-13.99	316.34659	319.32777
1.00	316.32098	319.07681	317.69879	2.75581	317.68042	2.74511	-14.74	316.32098	319.07681
2.00	316.27959	319.14243	317.71106	2.86273	317.68130	2.81826	-16.51	316.27959	319.14243
3.00	316.24534	319.18053	317.71350	2.93430	317.68299	2.87448	-18.72	316.24534	319.18053
4.00	316.21921	319.21402	317.71661	2.99481	317.68559	2.89654	-20.04	316.21921	319.21402
5.00	316.19529	319.24081	317.71857	3.04552	317.68713	2.91310	-21.40	316.19529	319.24081
6.00	316.17533	319.26428	317.72031	3.08795	317.68489	2.92759	-23.13	316.17533	319.26428
10.00	316.11277	319.33667	317.72522	3.22292	317.68479	2.94480	-28.93	316.11277	319.33667
20.00	316.01263	319.44583	317.72925	3.43320	317.68507	2.95364	-37.54	316.01263	319.44583
30.00	315.94754	319.50745	317.72748	3.55991	317.68516	2.95655	-50.28	315.94754	319.50745
40.00	315.89995	319.54745	317.72369	3.64749	317.68516	2.95656	-50.65	315.89995	319.54745

BAND(MHZ)	316.575	318.825
LMIN(DB)	-0.25	
LMAX(DB)	0.19	
LDEL(DB)	0.43	
PMIN(DEG)	-1259.03	
PMAX(DEG)	1260.99	
PDEL(DEG)	2520.02	

File: 40MB806A.DAT Passband Symmetry = 0.0 dB

PHONON CORPORATION

FILE=4CH8B86A.DAT 13:48:39 04-13-1998

PN_100834_026 FINAL_FUNCTIONAL TEMP:H FLIGHTS_2FUNCT /N DUAL_SXX

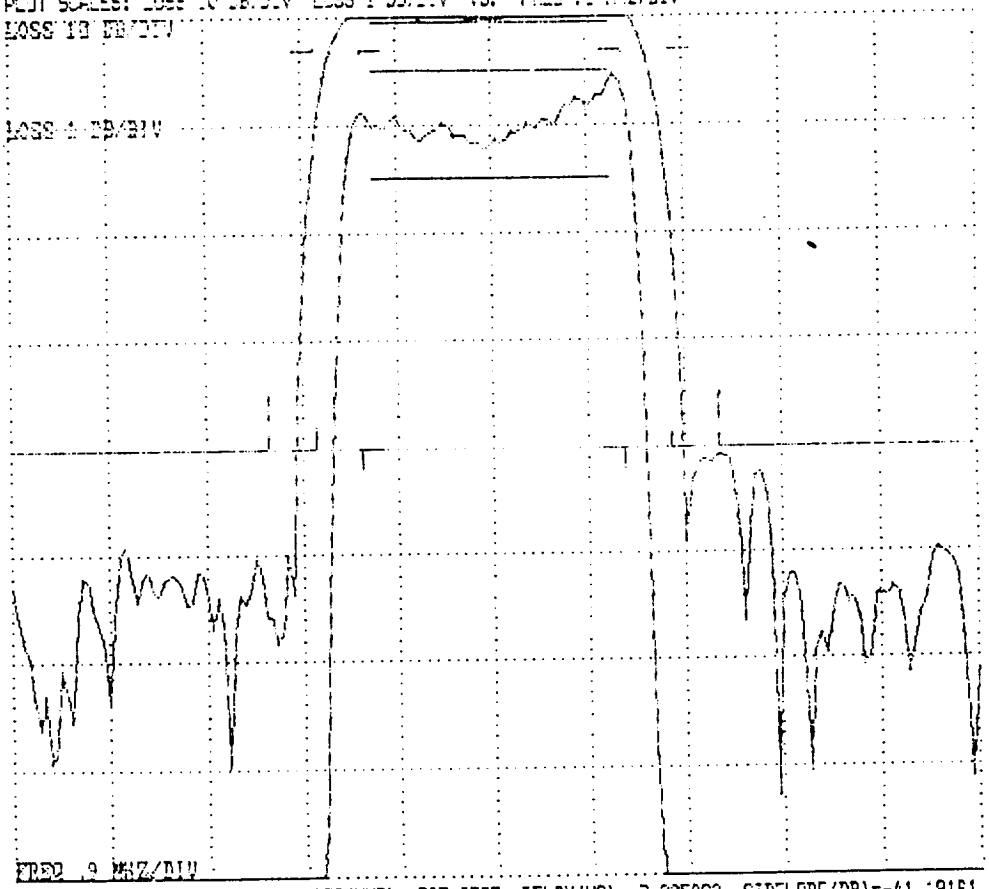
04-13-1998 HP8753,8SOF,8SFFIX,8SREF

FREQUENCY(MHZ): CENTER= 326.7 WIDTH= 9 INCR.= .25 SYSTEM BANDWIDTH= 2.25

REFERENCES: LOSS(DB)= 28.9035 PHASE(DEG)=-3738.699 DELAY(US)= 0 SLOPE(US/MHZ)= 0

RMS ERRORS: LOSS(DB)= .140567 PHASE(DEG)= 742.8812

PLOT SCALES: LOSS 10 DB/DIV LOSS 1 DB/DIV VS. FREQ .9 MHZ/DIV



PEAK: LEVEL(DB)= 28.41743 FREQ(MHZ)= 327.8535 DELAY(US)=-3.205892 SIDELOBE(DB)=-41.19181

ENERGY: LEVEL(DB)= 29.03188 CENTER(MHZ)= 326.6768 WIDTH(MHZ)= 3.068617 SKEW(MHZ)=-2.513868E-02

L(DB)	LO(MHZ)	HI(MHZ)	CTR(MHZ)	WID(MHZ)	AV-CTR(MHZ)	AV-WID(MHZ)	AV-SL(DB)	LOX(MHZ)	HIX(MHZ)
-0.48	327.85349	327.85349	327.85349	0.00000	327.85349	0.00000	0.00	327.85349	327.85349
0.50	325.31226	328.03621	326.66925	2.71396	326.69171	2.71450	-13.82	325.31226	328.03621
1.00	325.27744	328.05722	326.66732	2.77979	326.69015	2.79865	-15.45	325.27744	328.05722
2.00	325.22342	328.10234	326.66187	2.87892	326.68768	2.88618	-17.44	325.22342	328.10234
3.00	325.18658	328.13373	326.65016	2.94714	326.67355	2.89365	-18.63	325.15658	328.13373
4.00	325.15758	328.16058	326.65905	3.00305	326.68463	2.91557	-19.98	325.15758	328.16058
5.00	325.13321	328.18341	326.65823	3.05020	326.67490	2.93418	-21.43	325.13321	328.18341
6.00	325.11188	328.20352	326.65771	3.09164	326.68170	2.94728	-22.97	325.11188	328.20352
10.00	325.04449	328.26782	326.65616	3.22333	326.67629	2.97031	-29.15	325.04449	328.26782
20.00	324.93753	328.37180	326.65466	3.43427	326.67676	2.97692	-40.89	324.93753	328.37180
30.00	324.87128	328.43741	326.65436	3.56613	326.67679	2.97728	-47.40	324.87128	328.43741
40.00	324.83543	328.47226	326.65436	3.63583	326.67679	2.97732	-49.73	324.83543	328.47226

BAND(MHZ)	325.575	327.825
LMIN(DB)	-0.38	
LMAX(DB)	0.23	
LDEL(DB)	0.61	
PMIN(DEG)	-1259.36	
PMAX(DEG)	1256.79	
PDEL(DEG)	2517.15	

File: 4CH8B86A.DAT Passband Symmetry = 0.3 dB

Channel 15 Bandpass Filter

IF Filter (S/N: 1331559-1, S/N: 227-002)

APPENDIX A **QUALIFICATION TEST REPORT**

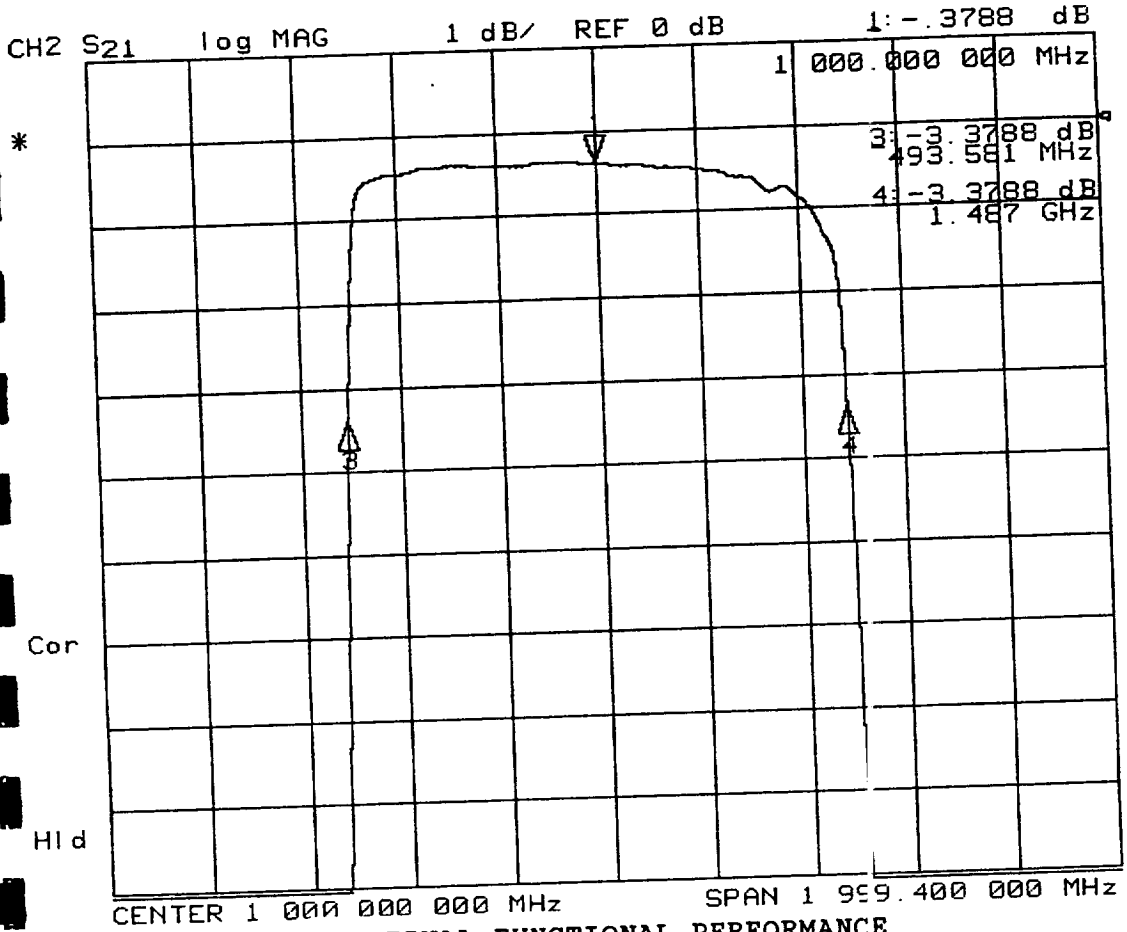
BANDPASS FILTER MODEL HL1000-1000-10SS1 S/N P227-002
AEROJET 1331559-1 REV. E

3.0 dB BANDWIDTH

QUALIFICATION TEST PROCEDURE 63-0005-010 PARA 4.5.3	-10°C	+15°C	+40°C
{7} UPPER 3.0 dB BANDEDGE	1487.68 MHz (1480.0-1500.0)	1486.67 Mhz (1480.0-1500.0)	1485.86 MHz (1480.01500.0)
{8} LOWER 3.0 dB BANDEDGE	493.58 MHz (480.0-500.0)	492.98 Mhz (480.0-500.0)	492.03 MHz (480.0-500.0)
{9} 3.0 dB RELATIVE BANDWIDTH	994.10 MHz (980.0-1020.0)	993.69 Mhz (980.0-1020.0)	993.83 MHz (980.0-1020.0)
{10} ADD {7} AND {8} ÷ 2 =	990.63 MHz (1000.0 NOM)	989.83 MHz (1000.0 NOM)	988.95 Mhz (1000.0 NOM)
{10a} RECORD MEASURED TEMPERATURE	-14.2 °C (-15.0 TO -10.0)	+14.1 °C (12.5 TO 17.5)	+42.0 °C (40.0 TO 45.0)
{6} ATTACH TRANSMISSION LOSS PERFORMANCE X-Y PLOT	✓ (√)	✓ (√)	✓ (√)

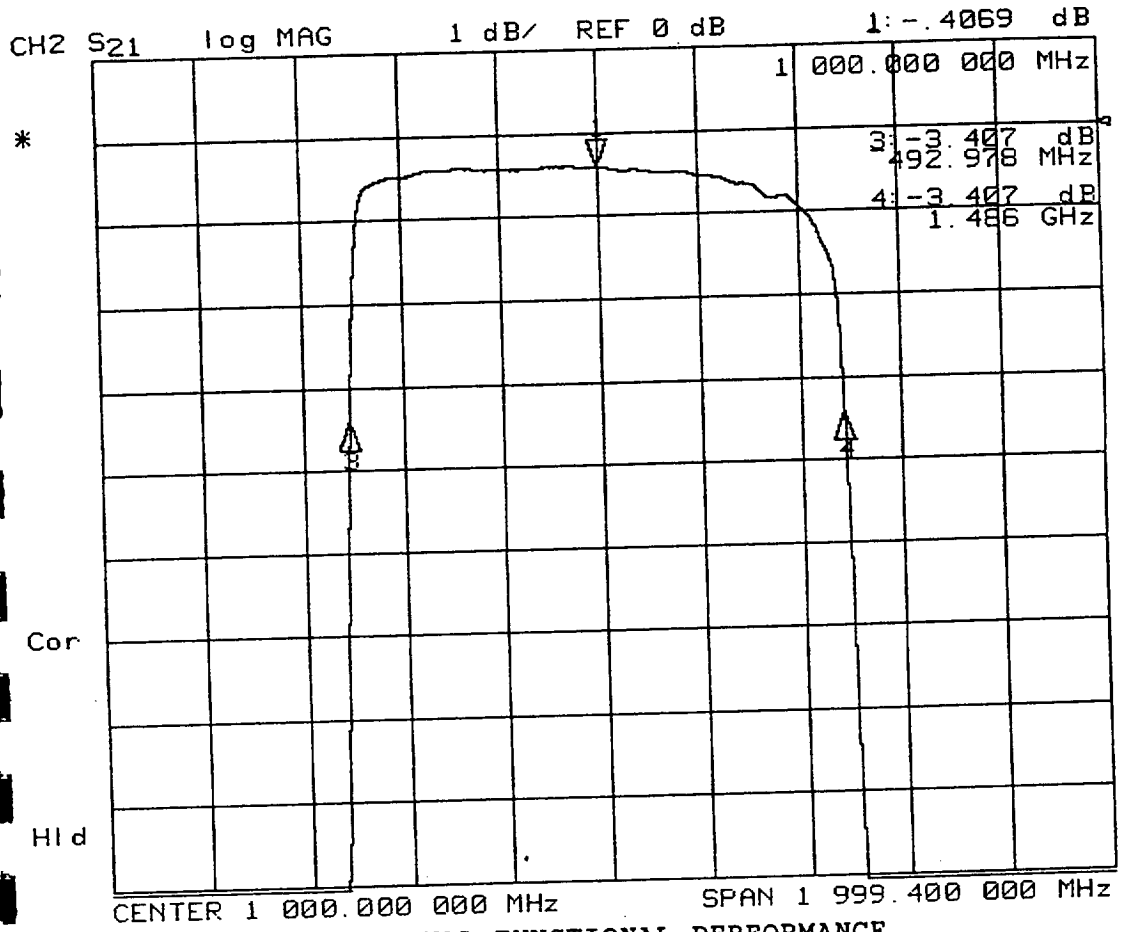
PASSBAND RIPPLE

QUALIFICATION TEST PROCEDURE 63-0005-010 PARA 4.5.4	-10°C	+15°C	+40°C
{11a} MIN INSERTION LOSS FREQ	940.02 MHz	725.08 Mhz	715.09 MHz
MIN INSERTION LOSS PERFORMANCE	-0.36 dB	-0.38 dB	-0.45 dB
{11b} 75% BW LOWER BANDEDGE FREQ	528.97 MHz	527.36 Mhz	523.28 MHz
75% BW LOWER BANDEDGE I.L. PERF	-0.60 dB	-0.64 dB	-0.74 dB
{11c} 75% BW UPPER BANDEDGE FREQ	1278.97 MHz	1277.36 Mhz	1273.28 MHz
75% BW UPPER BANDEDGE I.L. PERF	-0.60 dB	-0.64 dB	-0.74 dB
{11d} PERFORMANCE DELTA (I.L. @ {11b} - I.L. @ {11a})	0.24 dB	0.26 dB	0.29 dB
{11e} PERFORMANCE DELTA (I.L. @ {11c} - I.L. @ {11a})	0.24 dB	0.26 dB	0.29 dB



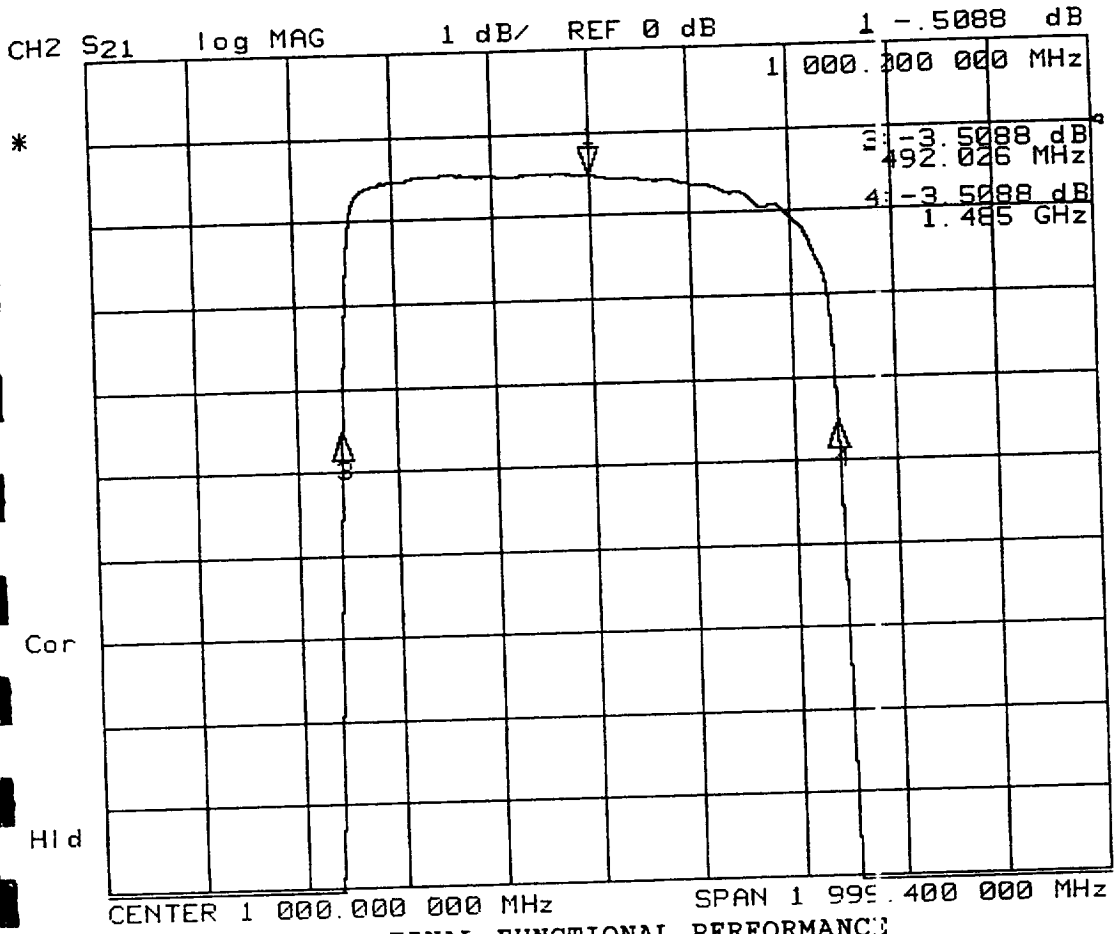
FINAL FUNCTIONAL PERFORMANCE
TRANSMISSION LOSS
SERIAL NO. P227-002
-10C DATA
OPR: R. HOGGATT DATE DEC 27 1996 annel 2

MARKER PARAMET		
MARKER 1	550.000000 MHz OFF	1000.000000 MHz -.3788 dB
MARKER 2	1450.000000 MHz OFF	990.632386 MHz OFF
MARKER 3	625.000000 MHz OFF	493.581458 MHz -3.3788 dB
MARKER 4	1375.000000 MHz OFF	1487.683314 MHz -3.3788 dB
MKR STIMULUS OFFSET	0.000000 MHz 0 dB	0.000000 MHz 0 dB
REFERENCE MARKER	OFF	OFF
PLACEMENT	CONTINUOUS	CONTINUOUS
MARKER SEARCH	OFF	OFF
TARGET VALUE	-3 dB	-3 dB
MARKER WIDTH VALUE	-3 dB	-3 dB
	OFF	OFF
MARKER TRACKING	OFF	OFF



FINAL FUNCTIONAL PERFORMANCE
TRANSMISSION LOSS
SERIAL NO. P227-002
+15C DATA
OPR: R. HOGGATT DATE DEC 27 1996 annel 2

MARKER PARAMET		
MARKER 1	550.000000 MHz OFF	1000.000000 MHz -.4069 dB
MARKER 2	1450.000000 MHz OFF	989.823566 MHz OFF
MARKER 3	625.000000 MHz OFF	492.978622 MHz -3.407 dB
MARKER 4	1375.000000 MHz OFF	1486.668510 MHz -3.407 dB
MKR STIMULUS OFFSET	0.000000 MHz 0 dB	0.000000 MHz 0 dB
REFERENCE MARKER	OFF	OFF
PLACEMENT	CONTINUOUS	CONTINUOUS
MARKER SEARCH	OFF	OFF
TARGET VALUE	-3 dB	-3 dB
MARKER WIDTH VALUE	-3 dB	-3 dB
	OFF	OFF
MARKER TRACKING	OFF	OFF



FINAL FUNCTIONAL PERFORMANCE
TRANSMISSION LOSS
SERIAL NO. P227-002
+40C DATA
OPR: R. HOGGATT DATE DEC 27 1996 Channel 2

MARKER PARAMETERS		
MARKER 1	550.000000 MHz OFF	1000.000000 MHz -.5088 dB
MARKER 2	1450.000000 MHz OFF	988.942245 MHz OFF
MARKER 3	625.000000 MHz OFF	492.026449 MHz -3.5088 dB
MARKER 4	1375.000000 MHz OFF	1485.858042 MHz -3.5088 dB
MKR STIMULUS OFFSET	0.000000 MHz 0 dB	0.000000 MHz 0 dB
REFERENCE MARKER	OFF	OFF
PLACEMENT	CONTINUOUS	CONTINUOUS
MARKER SEARCH	OFF	OFF
TARGET VALUE	-3 dB	-3 dB
MARKER WIDTH VALUE	-3 dB	-3 dB
	OFF	OFF
MARKER TRACKING	OFF	OFF

APPENDIX A **QUALIFICATION TEST REPORT**

BANDPASS FILTER MODEL HL1000-1000-10SS1 S/N P227-002
AEROJET 1331559-1 REV. E

PASSBAND RIPPLE (CON'T)

{11f} RECORD PASS/FAIL (0.5 dB MAX)	(PASS)/FAIL	(PASS)/FAIL	(PASS)/FAIL
{11g) ATTACH PASSBAND RIPPLE PERFORMANCE X-Y PLOT(S)	✓ (√)	✓ (√)	✓ (√)

OUT-OF-BAND REJECTION

QUALIFICATION TEST PROCEDURE 63-0005-010 PARA 4.5.5 Fc=1000.0 MHz. REF {5A} FOR INSERTION LOSS @ Fc	-10°C	+15°C	+40°C
{12} WORST CASE REJECTION FROM 0.300 MHz TO 350.0 MHz	-67.8 dB (40.0 dB MIN)	-67.6 dB (40.0 dB MIN)	-67.8 dB (40.0 dB MIN)
{13a} WORST CASE REJECTION FROM 1650.0 MHz TO 3000.0 MHz	-60.4 dB (40.0 dB MIN)	-60.6 dB (40.0 dB MIN)	-60.5 dB (40.0 dB MIN)
{13b} WORST CASE REJECTION FROM 3000.0 MHz TO 8000.0 MHz	-50.5 dB (40.0 dB MIN)	-50.2 dB (40.0 dB MIN)	-51.5 dB (40.0 dB MIN)
{13c} RECORD MEASURED TEMPERATURE	-14.3 °C (-15.0 TO -10.0)	+14.1 °C (12.5 TO 17.5)	+41.9 °C (40.0 TO 45.0)
{14} ATTACH REJECTION PERFORMANCE X-Y PLOT(S)	✓ (√)	✓ (√)	✓ (√)

TEST PERFORMED BY R. Hoggatt DATE 12/27/96

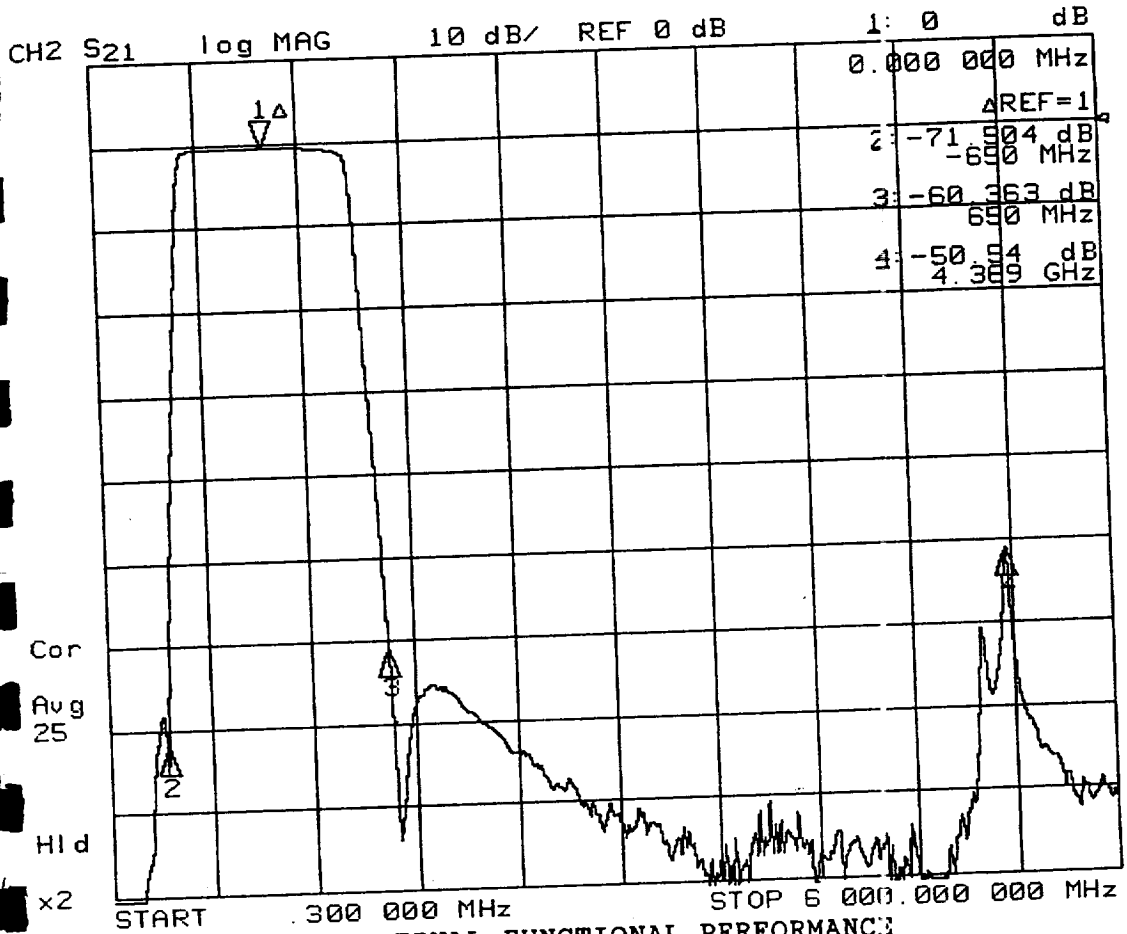
NOTE IF TEST WITNESSED BY AESD: _____ GSI: Not witnessed this time. DLD

***** END OF FUNCTIONAL PERFORMANCE TEST ****

OUTLINE AND MOUNTING DIMENSIONS VERIFICATION

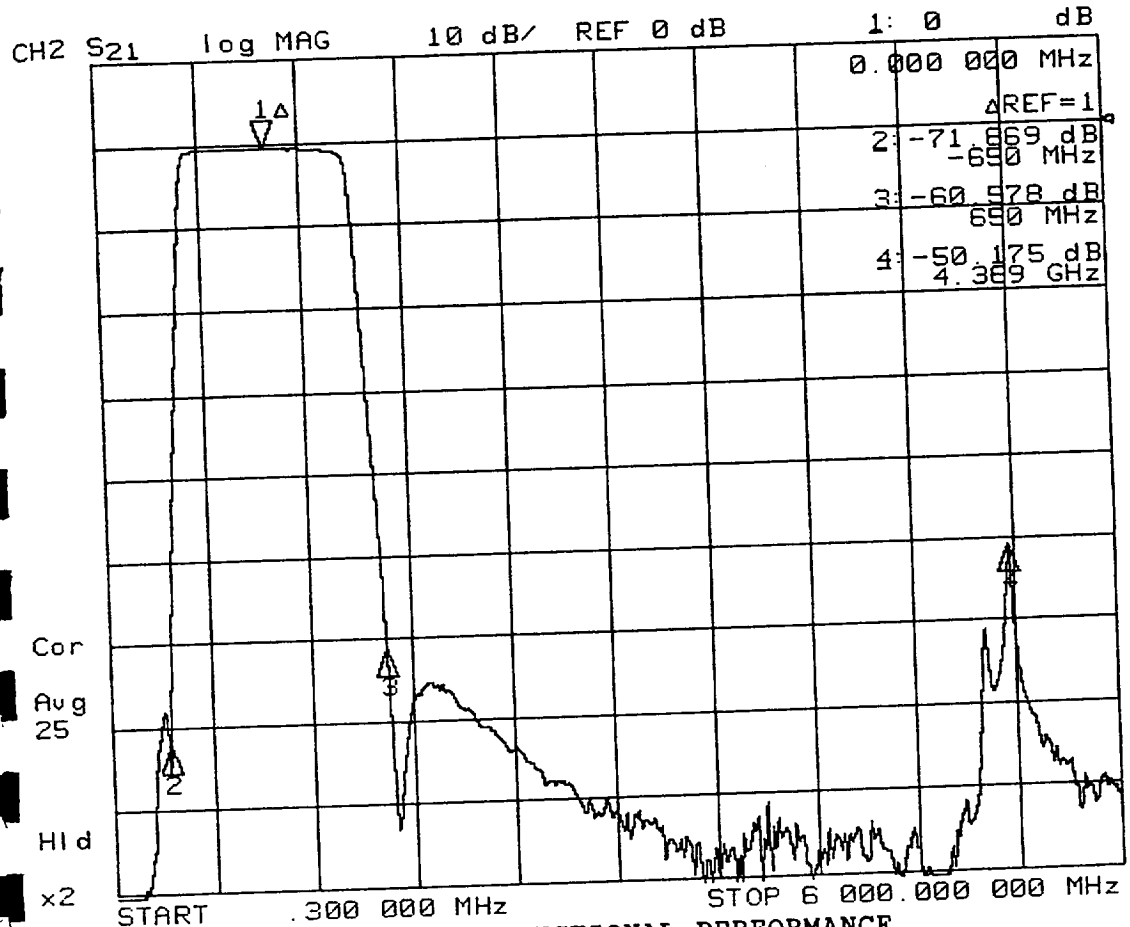
{16} REFERENCE CUSTOMER DRAWING 1331559

DESCRIPTION OF MEASUREMENT	DIMENSION AND TOLERANCE	ACTUAL MEASUREMENT
OVER ALL LENGTH	3.50 ± .03	3.501
MOUNTING HOLE CENTER	0.125 ± .010	0.128
BETWEEN UPPER MOUNTING HOLES	3.250	3.247
BETWEEN LOWER MOUNTING HOLES	3.250	3.250



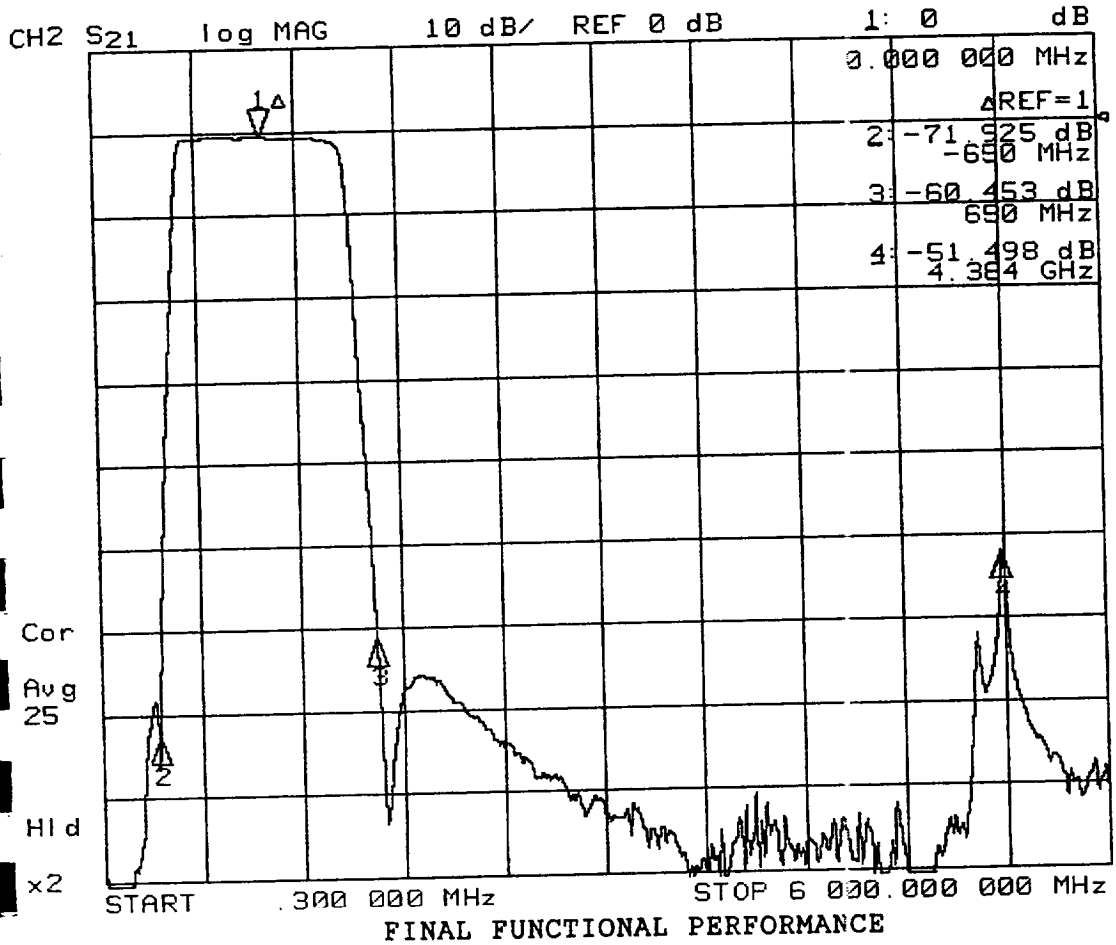
FINAL FUNCTIONAL PERFORMANCE
REJECTION PERFORMANCE
SERIAL NO. P227-002
-10C DATA
OPR: R. HOGGATT DATE DEC 27 996 annel 2

MARKER PARAMET		
MARKER 1	1000.000000 MHz OFF	1000.000000 MHz 0 dB
MARKER 2	1000.000000 MHz OFF	350.000000 MHz -71.504 dB
MARKER 3	1000.000000 MHz OFF	1650.000000 MHz -60.363 dB
MARKER 4	1000.000000 MHz OFF	5369.966088 MHz -50.54 dB
MKR STIMULUS OFFSET	0.000000 MHz 0 dB	0.000000 MHz 0 dB
REFERENCE MARKER	OFF	MARKER 1
PLACEMENT	CONTINUOUS	CONTINUOUS
MARKER SEARCH	OFF	OFF
TARGET VALUE	-3 dB	-3 dB
MARKER WIDTH VALUE	-3 dB	-3 dB
	OFF	OFF
MARKER TRACKING	OFF	OFF



FINAL FUNCTIONAL PERFORMANCE
REJECTION PERFORMANCE
SERIAL NO. P227-002
+15C DATA
OPR: R. HOGGATT DATE DEC 27 1995 annel 2

MARKER PARAMET		
MARKER 1	1000.000000 MHz OFF	1000.000000 MHz 0 dB
MARKER 2	1000.000000 MHz OFF	350.000000 MHz -71.669 dB
MARKER 3	1000.000000 MHz OFF	1650.000000 MHz -60.578 dB
MARKER 4	1000.000000 MHz OFF	5369.965976 MHz -50.175 dB
MKR STIMULUS OFFSET	0.000000 MHz 0 dB	0.000000 MHz 0 dB
REFERENCE MARKER	OFF	MARKER 1
PLACEMENT	CONTINUOUS	CONTINUOUS
MARKER SEARCH	OFF	OFF
TARGET VALUE	-3 dB	-3 dB
MARKER WIDTH VALUE	-3 dB	-3 dB
	OFF	OFF
MARKER TRACKING	OFF	OFF



FINAL FUNCTIONAL PERFORMANCE
REJECTION PERFORMANCE
SERIAL NO. P227-002
+40C DATA
OPR: R. HOGGATT DATE DEC 2[illegible] 1996 Channel 2

MARKER PARAMETI		
MARKER 1	1000.000000 MHz OFF	1000.000000 MHz 0 dB
MARKER 2	1000.000000 MHz OFF	350.000000 MHz -71.925 dB
MARKER 3	1000.000000 MHz OFF	1650.000000 MHz -60.453 dB
MARKER 4	1000.000000 MHz OFF	5384.965567 MHz -51.498 dB
MKR STIMULUS OFFSET	0.000000 MHz 0 dB	0.000000 MHz 0 dB
REFERENCE MARKER	OFF	MARKER 1
PLACEMENT	CONTINUOUS	CONTINUOUS
MARKER SEARCH	OFF	OFF
TARGET VALUE	-3 dB	-3 dB
MARKER WIDTH VALUE	-3 dB	-3 dB
	OFF	OFF
MARKER TRACKING	OFF	OFF

BANDPASS FILTER MODEL HL1000-1000-10SS1 S/N P227-002
AEROJET 1331559-1 REV. E

BANDPASS CHARACTERISTICS MEASUREMENT

PER QTP PARA 4.6
(REF: AE-24687, PARA 4.8.2)

RECORD THE AMBIENT ROOM TEMPERATURE: +22.2 °C (+19°C TO +29.0°C)

{15} ATTACH PASSBAND PERFORMANCE X-Y PLOT ✓ (√)

{24} TEST POINT MATRIX

REF	FREQ	UNIT	VALUE
F1	1.0	MHz	-91.4 dB
F2	10.0	MHz	-95.8 dB
F3	100.0	MHz	-101.3 dB
F4	300.0	MHz	-69.9 dB
F5	400.0	MHz	-39.7 dB
F6	500.0	MHz	-2.56 dB
F7	600.0	MHz	-0.57 dB
F8	700.0	MHz	-0.50 dB
F9	(*) 800.0	MHz	-0.53 dB
F10	(*) 900.0	MHz	-0.51 dB

REF	FREQ	UNIT	VALUE
F11	1000.0	MHz	-0.51 dB
F12	(*) 1100.0	MHz	-0.56 dB
F13	(*) 1200.0	MHz	-0.60 dB
F14	1300.0	MHz	-0.75 dB
F15	1400.0	MHz	-1.04 dB
F16	1500.0	MHz	-6.76 dB
F17	1600.0	MHz	-40.9 dB
F18	1700.0	MHz	-84.6 dB
F19	2000.0	MHz	-66.6 dB
F20	5000.0	MHz	-89.0 dB

TEST PERFORMED BY: R. HOGGATT (DA 5) DATE 12/28/96

NOTE IF TEST WITNESSED BY AESD _____ GSI _ Not witnessed this time. DLD

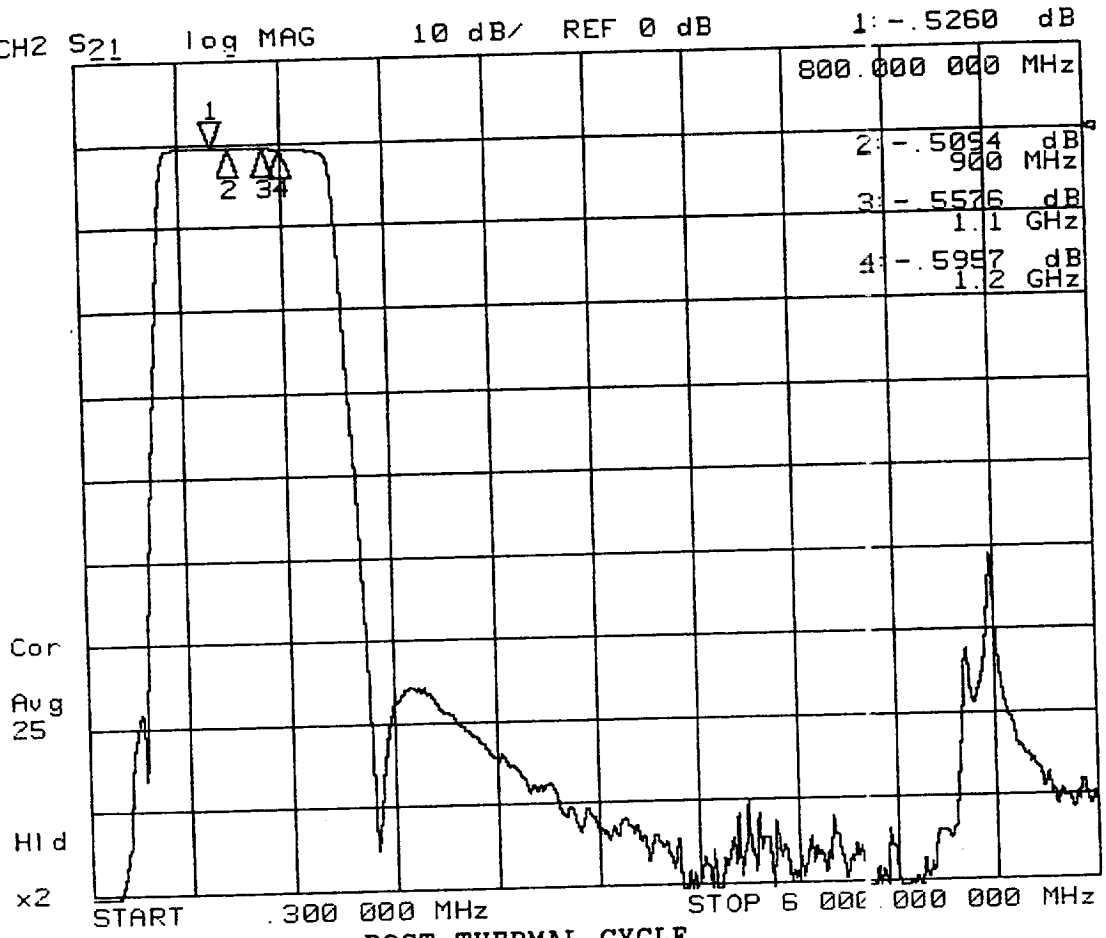
***** END OF BANDPASS CHARACTERISTICS TEST *****

FUNCTIONAL PERFORMANCE TEST

QUALIFICATION TEST PROCEDURE
63-0005-010 PARA 4.1

BRIEF TEST DESCRIPTION: THE TESTS DESCRIBED IN APPENDIX A PAGE 10 THRU PAGE 13 ARE PERFORMED TO DOCUMENT THE FUNCTIONAL PERFORMANCE OF THE UNIT AT THE CONCLUSION OF ALL ENVIRONMENTAL TESTING. THE TESTS ARE AS FOLLOWS AND IN ANY SEQUENCE:

a.) VSWR PER QTP PARA 4.5.1.
b.) INSERTION LOSS PER QTP PARA 4.5.2
c.) INSERTION LOSS VS TEMPERATURE PER QTP PARA 4.5.6.
d.) 3.0 dB BANDWIDTH PER QTP PARA 4.5.3.
e.) CENTER FREQUENCY (fc) PER QTP PARA 4.5.7 (PART OF 3.0 dB B/W TEST)
f.) PASSBAND RIPPLE PER QTP PARA 4.5.4 (PART OF INSERTION LOSS TEST).
g.) OUT-OF-BAND REJECTION PER QTP PARA 4.5.5.



POST THERMAL CYCLE
PASSBAND CHARACTERISTICS
SERIAL NO. P227-002
AMBIENT
OPR: R. HOGGATT DATE DEC 28 1986 annel 2

MARKER PARAMET		
MARKER 1	1000.000000 MHz OFF	800.000000 MHz -.5260 dB
MARKER 2	1000.000000 MHz OFF	900.000000 MHz -.5094 dB
MARKER 3	1000.000000 MHz OFF	1100.000000 MHz -.5576 dB
MARKER 4	1000.000000 MHz OFF	1200.000000 MHz -.5957 dB
MKR STIMULUS OFFSET	0.000000 MHz 0 dB	0.000000 MHz 0 dB
REFERENCE MARKER	OFF	OFF
PLACEMENT	CONTINUOUS	CONTINUOUS
MARKER SEARCH	OFF	OFF
TARGET VALUE	-3 dB	-3 dB
MARKER WIDTH VALUE	-3 dB	-3 dB
	OFF	OFF
MARKER TRACKING	OFF	OFF

GAIN STABILITY AND GAIN COMPRESSION

FOR

MIXER/AMPLIFIERS AND IF AMPLIFIERS

GAIN-TEMPERATURE SENSITIVITY FOR MIXER/AMPLIFIERS AND IF AMPLIFIERS

Channel No.	3	4	5	6	7	8	9	10	11	12	13	14	15
Specification (+/-dB/°C)	0.02	0.02	0.02	0.02	0.02	0.02	0.04	0.04	0.06	0.06	0.06	0.06	0.02
Measured (dB/°C)	-0.015	-0.015	-0.013	-0.013	-0.020	-0.011	-0.015 +0.003	-0.015 +0.004	-0.015 +0.003 -0.014	-0.015 +0.003 -0.014	-0.015 +0.003 -0.011	-0.015 +0.003 -0.016	-0.009
Total (dB/°C)	-0.015	-0.015	-0.013	-0.013	-0.020	-0.011	+0.003, -0.015	+0.004, -0.015	+0.003, -0.029	+0.003, -0.029	+0.003, -0.026	+0.003, -0.031	-0.009

Channel 3 Mixer/Amplifier

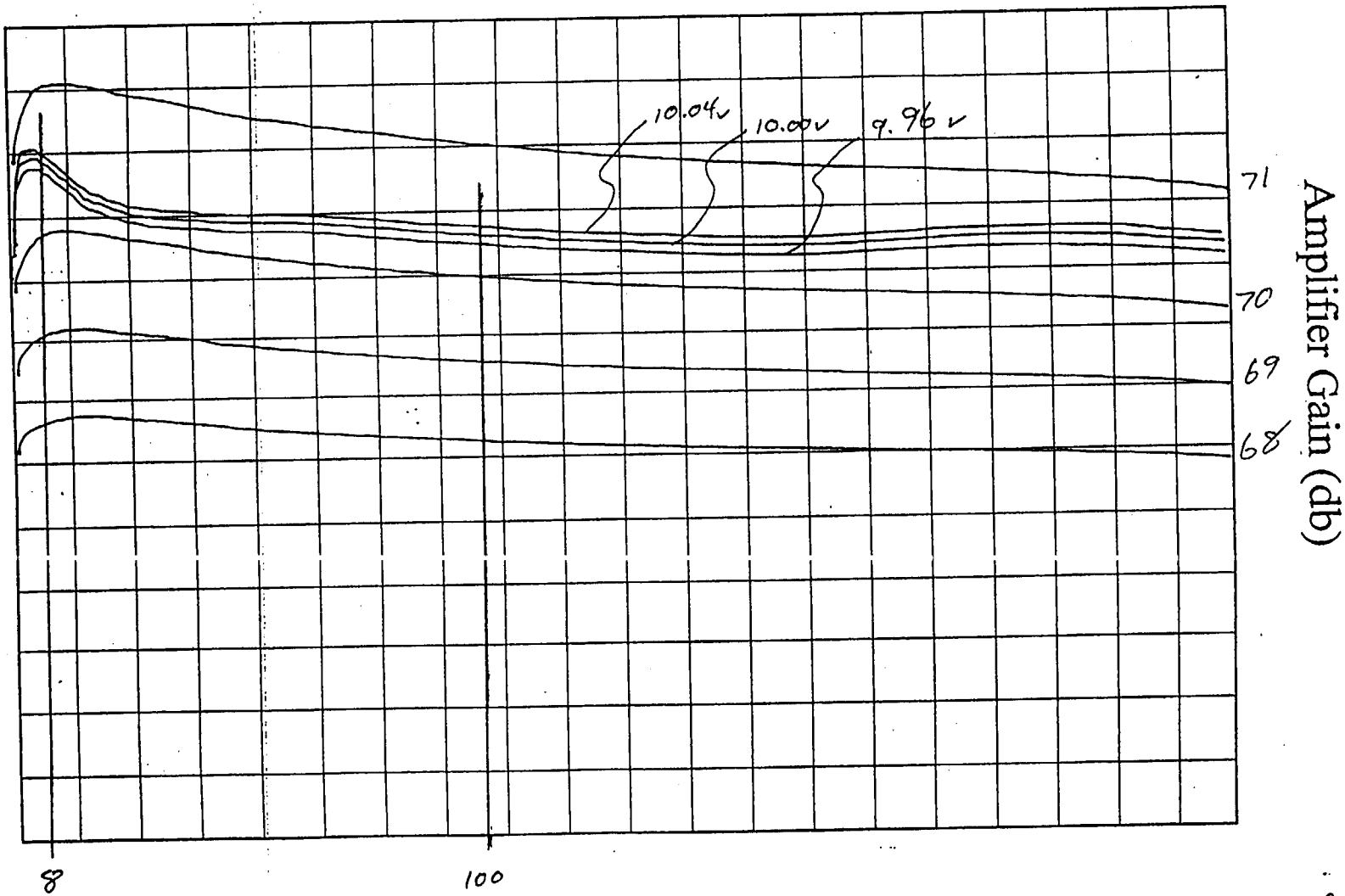
Mixer/Amplifier (P/N: 1331562-13, S/N: 7A13)

SPACEK LABS, INC.
MM-WAVE TECHNOLOGY

Amplifier Gain

Model No. 1331562-13
Serial No. 7A13
Date 10-21-97
Tested By TTH

Amb Temp 23'C



0.4
1

TEST DATA SHEET NO. 7. AMPLIFIER TESTS

GAIN VERSUS TEMPERATURE SENSITIVITY TEST: ATP PARAGRAPH 5.1.5

Nominal Temperature (°C)	Relative Gain	ΔG/ΔT	SPEC	ACC	REJ
T1 +40	G_{T1} 70.0				
		* .025	0.035dB/°C	QA 1	
T2 +28	G_{T2} 70.3				
		* .025	0.020dB/°C		QA 1
T3 + 8	G_{T3} 70.8				
		* .021	0.035dB/°C	QA 1	
T4 − 6	G_{T4} 71.1				

* Perform the following calculations and record on the TDS

$$\Delta G/\Delta T = \frac{G_{Ti} - G_{Ti+1}}{T_i - T_{i+1}} \qquad i = 1,2,3,4$$

ΔG_T = 1.1 dB

$\Delta G_{TOTAL} = \Delta G_V + \Delta G_T + 0.4 =$ 1.65 dB Spec 1.4dB ACC_____ REJ_____ QA 1

	DATE	ACC	REJ
SPACEK QA	10-28-97		QA 1

PART NO. 1331562-135

SER NO. 7A13

TESTED BY: [signature]

END DATE: 10-28-97

END TIME: 4:00pm

TEST FAILURE: _____

FAILURE ANALYSIS NO. _____

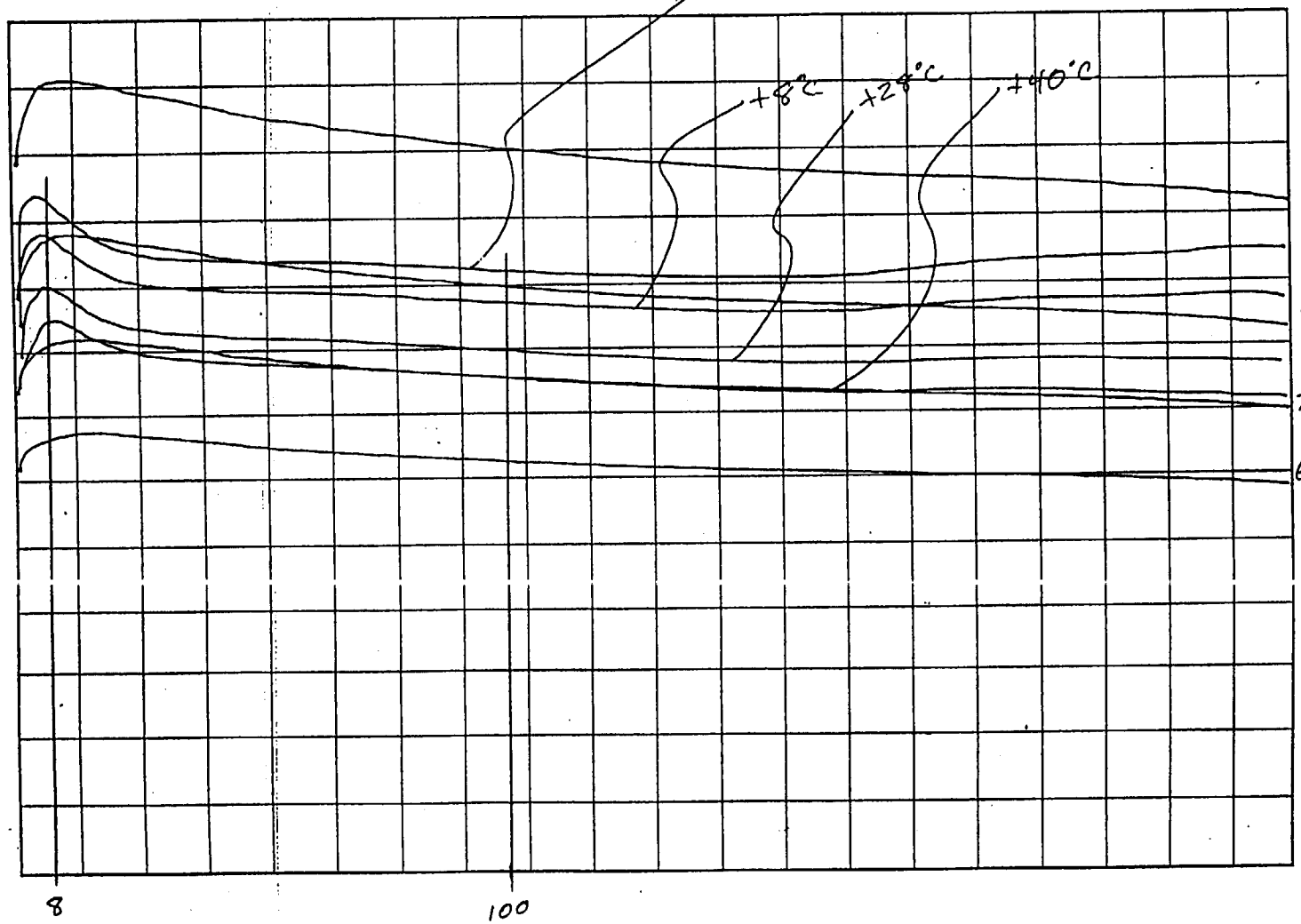
Spacek Labs, Inc.
212 E. Gutierrez St.
Santa Barbara,CA,93101

SPACEK LABS, INC.
MM-WAVE TECHNOLOGY

Amplifier Gain

Model No. 1331562-13F
Serial No. 7A13
Date 10-21-97
Tested By >77

Amb Temp 23°C



Q1
1

TEST DATA SHEET NO. 8. AMPLIFIER TESTS

OUTPUT 1.0 dB COMPRESSION POINT TEST: ATP PARAGRAPH 5.1.6

DASH #

11	12	13	14	15	16	17	18	19	20	FREQ. (MHz)	P2 COMP (dBm)	OUTPUT COMP. at+10(dBm)	SPEC. COMP. PT.(dBm)	ACC	REJ
X	X	X	X		X	X	X	X		10	-2.2	0.8	1.0	QA	
				X						20	—	—	—		
	X		X							50	-2.5	0.5	1.0	QA	
X	X	X	X	X	X	X	X			100	-2.5	0.5	1.0	QA	
X										150					
			X	X	X	X	X	X		200					
								X		400					
									X	500					
									X	1000					
									X	1500					

AMPLIFIER NOISE FIGURE AND TOTAL POWER TEST: ATP PARAGRAPH 5.1.7

DATE: 10-28-97 AMBIENT ROOM TEMPERATURE °C: 23

AMPLIFIER OUTPUT POWER AMBIENT (dBm)	AMPLIFIER OUTPUT POWER (-77 K)(dBm)	Y FACTOR (dB)	AMPLIFIER NOISE FIGURE (dB)
-24.3	-28.0	3.7	1.11

Above data taken with Daden filter attached (except -19) .

Intermediate test results for information only

	DATE	ACC	REJ
PART NO. 1331562-13F	SPACEK QA	10-28-97	
SER NO. 7A13	TEST FAILURE:		
TESTED BY:	FAILURE ANALYSIS NO.		
END DATE: 10/28/97			
END TIME: 4:00pm			

Spacek Labs, Inc.
212 E. Gutierrez St.
Santa Barbara,CA,93101

TEST DATA SHEET NO. 13. MIXER-AMPLIFIER ASSEMBLY TESTS

NOISE FIGURE, TOTAL POWER AND CURRENT VS. TEMPERATURE TEST: ATP PARA 5.4.8.

DATE: 1-5-98 AMBIENT ROOM TEMPERATURE °C: +22

UUT TEMP °C.	UUT CURRENT (mA)	MIXER-AMP. OUTPUT POWER (AMBIENT) (dBm)	MIXER-AMP. OUTPUT POWER (77 DEG K) (dBm)	Y FACTOR (dB)	MIXER-AMP. NOISE FIGURE (dB)	SPEC. MIXER-AMP. NOISE FIGURE (dB)	ACC	REJ
-6	43.6	-23.30	-25.30	2.00	3.1	3.8	QA 1	
+8	43.7	-23.50	-25.45	1.95	3.2	3.8	QA 1	
+28	43.8	-23.70	-25.65	1.95	3.2	3.8	QA 1	
+40	43.8	-24.00	-25.95	1.95	3.2	3.8	QA 1	

Noise figure change 0.1 dB Spec is .3dB peak to peak on -11 thru 19 Spec is .5dB peak to peak on -20 thru -8 ACC QA 1 REJ _____

NOTE: *Above data to be taken with the Daden filter, except on the -19 unit.*

NEΔT-NOISE POWER STABILITY TEST: ATP PARAGRAPH 5.4.9

Date: 1-19-98 Ambient Room Temperature °C: 23

Attach computer generated *NEΔT* spreadsheet to this test data sheet.

Record the calculated Nps(K) from spreadsheet data: 0.060

Record Nps(K) 0.08 for dash number from Aerojet specification AE-24869, Table II.
Accept units if calculated Nps(K) is less than or equal to specified Nps(K), otherwise reject.

ACC QA 1 REJ _____

PART NO. 1331562-135

SER NO. 7A13

TESTED BY: [signature]

END DATE: 1-19-98

END TIME: 4:00 pm

DATE	ACC	REJ
SPACEK QA 1-21-98	QA 1	

TEST FAILURE _____

FAILURE ANALYSIS NO. _____

Spacek Labs, Inc.
212 E. Gutierrez St.
Santa Barbara,CA,93101

Channel 4 Mixer/Amplifier

Mixer/Amplifier (P/N: 1331562-14, S/N: 7A14)

TEST DATA SHEET NO. 6. AMPLIFIER TESTS

GAIN FLATNESS TEST: ATP PARAGRAPH 5.1.3

GAIN FLATNESS (dB)ppK	SPEC. GAIN FLATNESS (dB)ppK	ACC	REJ
0.15	0.5	QA 1	

GAIN VERSUS VOLTAGE SENSITIVITY TEST: ATP PARAGRAPH 5.1.4

AMPLIFIER VOLTAGE	GAIN READING (dBm)	ΔG/ΔV	SPEC. ΔG/ΔV	ACC	REJ
10.04	70.52	1.75	2.0	QA 1	
10.00	70.45				
9.96	70.38				
ΔGv =	0.14 dB				

	DATE	ACC	REJ
SPACEK QA	10-28-97	QA 1	

PART NO. 1331562-145

SER NO. 7A14

TESTED BY: TTT

END DATE: 10-28-97

END TIME: 4:00pm

TEST FAILURE: _____

FAILURE ANALYSIS NO. _____

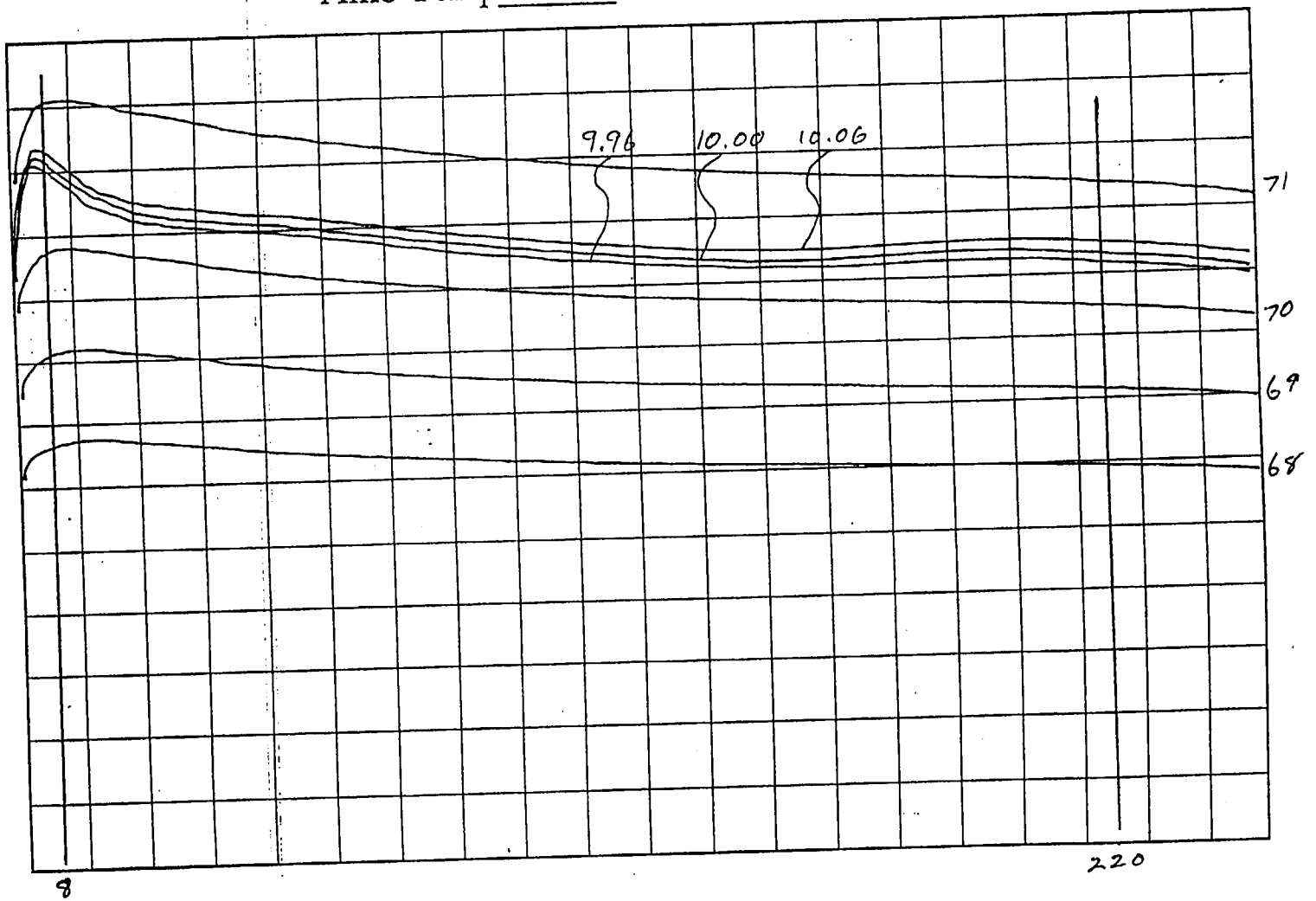
Spacek Labs, Inc.
212 E. Gutierrez St.
Santa Barbara,CA,93101

SPACEK LABS, INC.
MM-WAVE TECHNOLOGY

Amplifier Gain

Model No. 1331562-14 B
Serial No. 7A 14
Date 10-21-97
Tested By 777

Amb Temp 23'c



Amplifier Gain (db)

Frequency (Mhz)

QA
1

TEST DATA SHEET NO. 7. AMPLIFIER TESTS

GAIN VERSUS TEMPERATURE SENSITIVITY TEST: ATP PARAGRAPH 5.1.5

Nominal Temperature (°C)	Relative Gain	ΔG/ΔT	SPEC	ACC	REJ
T1 +40	G_{T1} 70.1				
		* -042	0.035dB/°C		QA 1
T2 +28	G_{T2} 70.6				
		* -031	0.020dB/°C		QA 1
T3 +8	G_{T3} 71.22				
		* -020	0.035dB/°C	QA 1	
T4 −6	G_{T4} 71.5				

• Perform the following calculations and record on the TDS

$$\Delta G/\Delta T = \frac{G_{Ti} - G_{Ti+1}}{T_i - T_{i+1}} \quad i = 1,2,3,4$$

ΔG_T = 1.4 dB

$\Delta G_{TOTAL} = \Delta G_V + \Delta G_T + 0.4 =$ 1.94 dB Spec 1.4dB ACC____ REJ QA 1

	DATE	ACC	REJ
PART NO. 1331562-146	SPACEK QA	10-28-97	QA 1

SER NO. 7A14

TESTED BY: TTT

END DATE: 10-28-97

END TIME: 4:00 pm

TEST FAILURE: _____

FAILURE ANALYSIS NO. _____

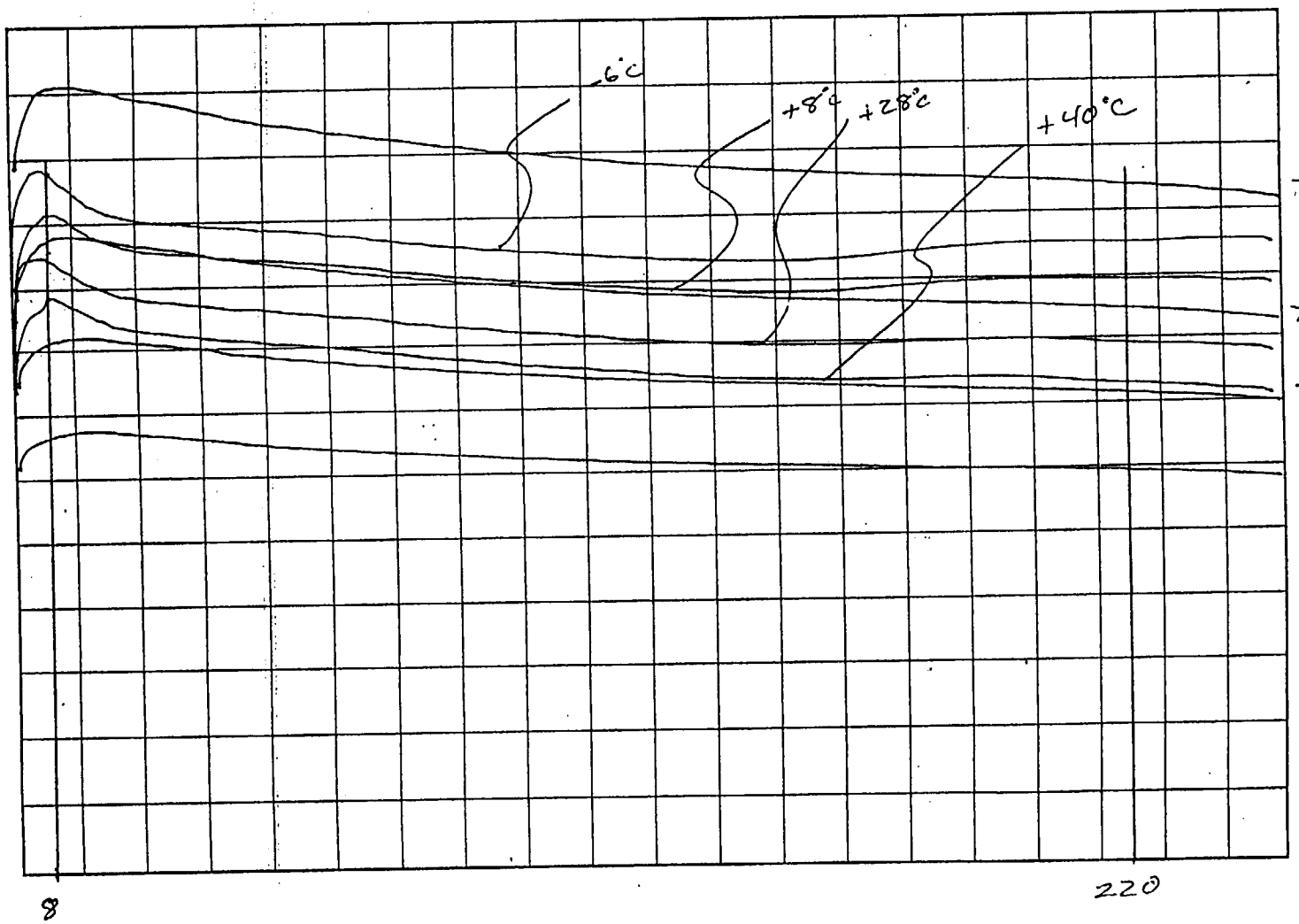
Spacek Labs, Inc.
212 E. Gutierrez St.
Santa Barbara,CA,93101

SPACEK LABS, INC.
MM-WAVE TECHNOLOGY

Amplifier Gain

Model No. 1331562-14G
Serial No. 7A14
Date 10-21-97
Tested By TTY

Amb Temp 23°C



QA 1

TEST DATA SHEET NO. 8. AMPLIFIER TESTS

OUTPUT 1.0 dB COMPRESSION POINT TEST: ATP PARAGRAPH 5.1.6

DASH #

11	12	13	14	15	16	17	18	19	20	FREQ. (MHz)	P2 COMP (dBm)	OUTPUT COMP. at+10(dBm)	SPEC. COMP. PT.(dBm)	ACC	REJ
X	X	X	X		X	X	X	X		10	-2.3	0.7	1.0	QA	
				X						20	—	—	—		
		X	X							50	—	—	—		
X	X	X	X	X	X	X	X			100	-2.6	0.4	1.0	QA	
X										150	—	—	—		
		X	X	X	X	X	X			200	-2.5	0.5	1.0	QA	
							X			400					
								X		500					
								X		1000					
								X		1500					

AMPLIFIER NOISE FIGURE AND TOTAL POWER TEST: ATP PARAGRAPH 5.1.7

DATE: 10-28-97 AMBIENT ROOM TEMPERATURE °C: 23

AMPLIFIER OUTPUT POWER AMBIENT (dBm)	AMPLIFIER OUTPUT POWER (-77 K)(dBm)	Y FACTOR (dB)	AMPLIFIER NOISE FIGURE (dB)
20.0	23.6	3.6	1.19

Above data taken with Daden filter attached (except -19).

Intermediate test results for information only

	DATE	ACC	REJ
SPACEK QA	10-28-97	QA	

PART NO. 1331562-146

SER NO. 7A14

TESTED BY: [signature]

END DATE: 10-28-87

END TIME: 4:00 pm

TEST FAILURE: _____

FAILURE ANALYSIS NO. _____

Spacek Labs, Inc.
212 E. Gutierrez St.
Santa Barbara,CA,93101

TEST DATA SHEET NO. 13. MIXER-AMPLIFIER ASSEMBLY TESTS

NOISE FIGURE, TOTAL POWER AND CURRENT VS. TEMPERATURE TEST: ATP PARA 5.4.8.

DATE: 1-5-98 AMBIENT ROOM TEMPERATURE °C: +22

UUT TEMP °C.	UUT CURRENT	MIXER-AMP. OUTPUT POWER (AMBIENT) (dBm)	MIXER-AMP. OUTPUT POWER (77 DEG K) (dBm)	Y FACTOR (dB)	MIXER-AMP. NOISE FIGURE (dB)	SPEC. MIXER-AMP. NOISE FIGURE (dB)	ACC	REJ
-6	43.3	-19.40	-21.55	2.15	2.8	3.8	QA 1	
+8	43.4	-19.60	-21.70	2.10	2.9	3.8	QA 1	
+28	43.5	-19.90	-22.00	2.10	2.9	3.8	QA 1	
+40	43.5	-20.10	-22.20	2.10	2.9	3.8	QA 1	

Noise figure change 0.1 dB Spec is .3dB peak to peak on -11 thru -19 Spec is .5dB peak to peak on -20 dB ACC QA 1 REJ

NOTE: *Above data to be taken with the Daden filter, except on the -19 unit.*

NEΔT-NOISE POWER STABILITY TEST: ATP PARAGRAPH 5.4.9

Date: 1-19-98 Ambient Room Temperature °C: 23

Attach computer generated *NEΔT* spreadsheet to this test data sheet.

Record the calculated Nps(K) from spreadsheet data: 0.030

Record Nps(K) 0.08 for dash number from Aerojet specification AE-24869, Table II.
Accept units if calculated Nps(K) is less than or equal to specified Nps(K), otherwise reject.

ACC QA 1 REJ

	DATE	ACC	REJ
SPACEK QA	1-19-98		

PART NO. 1331562-145

SER NO. 7A14

TESTED BY: [signature]

END DATE: 1-19-98

END TIME: 1600

TEST FAILURE:

FAILURE ANALYSIS NO.

Spacek Labs, Inc.
212 E. Gutierrez St.
Santa Barbara,CA,93101

Channel 5 Mixer/Amplifier

Mixer/Amplifier (P/N: 1331562-15, S/N: 7A15)

TEST DATA SHEET NO. 6. AMPLIFIER TESTS

GAIN FLATNESS TEST: ATP PARAGRAPH 5.1.3

GAIN FLATNESS (dB)ppK	SPEC. GAIN FLATNESS (dB)ppK	ACC	REJ
0.3	0.5	QA 1	

GAIN VERSUS VOLTAGE SENSITIVITY TEST: ATP PARAGRAPH 5.1.4

AMPLIFIER VOLTAGE	GAIN READING (dBm)	ΔG/ΔV	SPEC. ΔG/ΔV	ACC	REJ
10.04	70.75	1.875	2.0	QA 1	
10.00	70.68				
9.96	70.60				
ΔGv =	0.15 dB				

	DATE	ACC	REJ
SPACEK QA	10-28-97	QA 1	

PART NO. 1331562-156

SER NO. 7A15

TESTED BY: [signature]

END DATE: 10-28-97

END TIME: 4:00pm

TEST FAILURE: _____

FAILURE ANALYSIS NO. _____

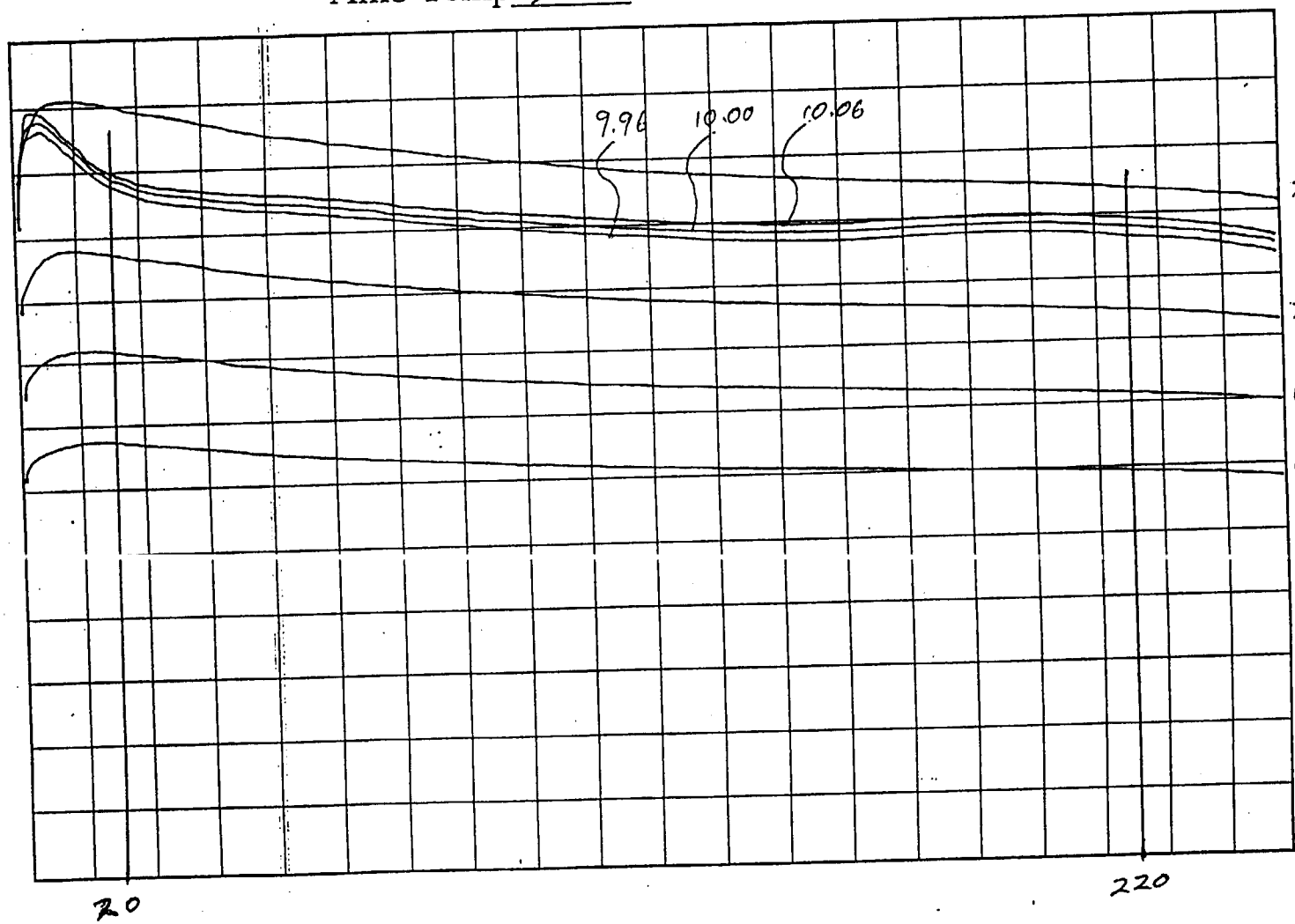
Spacek Labs, Inc.
212 E. Gutierrez St.
Santa Barbara,CA,93101

SPACEK LABS, INC.
MM-WAVE TECHNOLOGY

Amplifier Gain

Model No. 1331562-16
Serial No. 7A15
Date 10-21-97
Tested By TTK

Amb Temp 23°C



TEST DATA SHEET NO. 7. AMPLIFIER TESTS

GAIN VERSUS TEMPERATURE SENSITIVITY TEST: ATP PARAGRAPH 5.1.5

Nominal Temperature (°C)	Relative Gain	ΔG/ΔT	SPEC	ACC	REJ
T1 +40	G_{T1} 70.12				
		* .044	0.035dB/°C		QA 1
T2 +28	G_{T2} 70.65				
		* .033	0.020dB/°C		QA 1
T3 +8	G_{T3} 71.30				
		* .018	0.035dB/°C	QA 1	
T4 -6	G_{T4} 71.55				

* Perform the following calculations and record on the TDS

$$\Delta G/\Delta T = \frac{G_{Ti} - G_{Ti+1}}{T_i - T_{i+1}} \qquad i = 1,2,3,4$$

ΔG_T = 1.43 dB

$\Delta G_{TOTAL} = \Delta G_V + \Delta G_T + 0.4$ = 1.98 dB Spec 1.4dB ACC____ REJ____ QA 1

	DATE	ACC	REJ
SPACEK QA	10-28-97		QA 1

PART NO. 1331562-156

SER NO. 7A15

TESTED BY: [signature]

END DATE: 10-28-97

END TIME: 4:00 pm

TEST FAILURE: _____

FAILURE ANALYSIS NO. _____

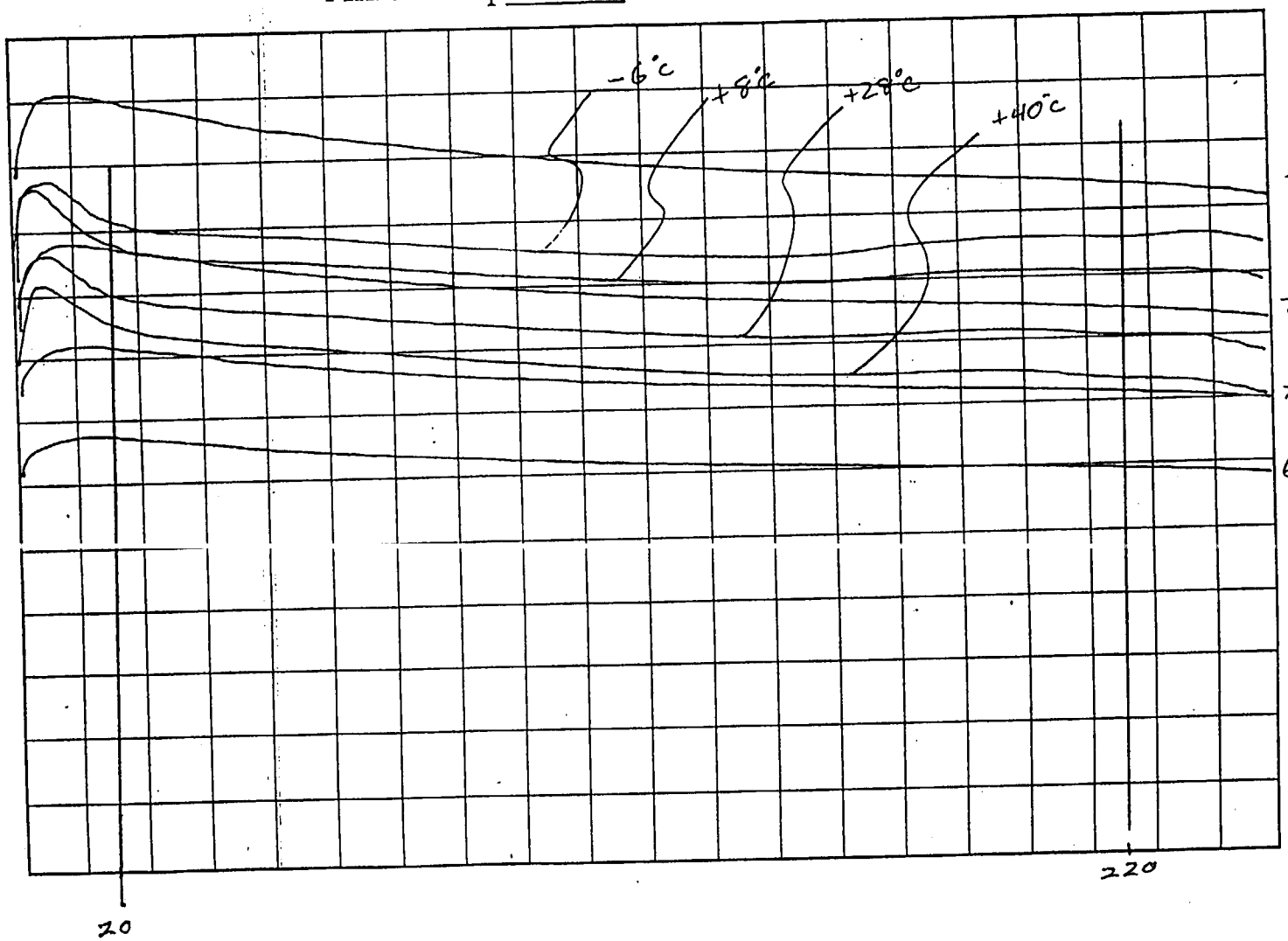
Spacek Labs, Inc.
212 E. Gutierrez St.
Santa Barbara,CA,93101

SPACEK LABS, INC.
MM-WAVE TECHNOLOGY

Amplifier Gain

Model No. 1331562-15G
Serial No. 7A15
Date 10-21-97
Tested By 777

Amb Temp 23°C



QA 1

TEST DATA SHEET NO. 8. AMPLIFIER TESTS

OUTPUT 1.0 dB COMPRESSION POINT TEST: ATP PARAGRAPH 5.1.6

DASH #

11	12	13	14	15	16	17	18	19	20	FREQ. (MHz)	P2 COMP (dBm)	OUTPUT COMP. at+10(dBm)	SPEC. COMP. PT.(dBm)	ACC	REJ
X	X	X	X		X	X	X	X		10					
				X						20	-2.6	0.4	1.0	QA	
	X	X								50	-	-	-		
X	X	X	X	X	X	X	X			100	-2.6	0.4	1.0	QA	
X										150	-	-	-		
			X	X	X	X	X	X		200	-2.5	0.5	1.0	QA	
								X		400					
									X	500					
									X	1000					
									X	1500					

AMPLIFIER NOISE FIGURE AND TOTAL POWER TEST: ATP PARAGRAPH 5.1.7

DATE: 10-28-97 AMBIENT ROOM TEMPERATURE °C: 23

AMPLIFIER OUTPUT POWER AMBIENT (dBm)	AMPLIFIER OUTPUT POWER (-77 K)(dBm)	Y FACTOR (dB)	AMPLIFIER NOISE FIGURE (dB)
20.8	24.3	3.5	1.27

Above data taken with Daden filter attached (except -19) .

Intermediate test results for information only

		DATE	ACC	REJ
PART NO. 1331562-156	SPACEK QA	10-28-97	QA	
SER NO. 7A15	TEST FAILURE:			
TESTED BY: [illegible]	FAILURE ANALYSIS NO.			
END DATE: 10-28-97				
END TIME: 4:00pm				

Spacek Labs, Inc.
212 E. Gutierrez St.
Santa Barbara,CA,93101

TEST DATA SHEET NO. 13. MIXER-AMPLIFIER ASSEMBLY TESTS

NOISE FIGURE, TOTAL POWER AND CURRENT VS. TEMPERATURE TEST: ATP PARA 5.4.8.

DATE: 1-5-98 AMBIENT ROOM TEMPERATURE °C: +22

UUT TEMP °C.	UUT CURRENT	MIXER-AMP. OUTPUT POWER (AMBIENT) (dBm)	MIXER-AMP. OUTPUT POWER (77 DEG K) (dBm)	Y FACTOR (dB)	MIXER-AMP. NOISE FIGURE (dB)	SPEC. MIXER-AMP. NOISE FIGURE (dB)	ACC	REJ
-6	43.1	-20.10	-22.25	2.15	2.8	3.8	QA 1	
+8	43.1	-20.30	-22.40	2.10	2.9	3.8	QA 1	
+28	43.2	-20.50	-22.60	2.10	2.9	3.8	QA 1	
+40	43.3	-20.70	-22.80	2.10	2.9	3.8	QA 1	

Noise figure change 0.1 dB Spec is .5dB peak to peak on -20 Spec is .3dB peak to peak on -11 thru -19 ACC QA 1 REJ

NOTE: *Above data to be taken with the Daden filter, except on the -19 unit.*

NEΔT-NOISE POWER STABILITY TEST: ATP PARAGRAPH 5.4.9

Date: 1-19-98 Ambient Room Temperature °C: 23

Attach computer generated *NEΔT* spreadsheet to this test data sheet.

Record the calculated Nps(K) from spreadsheet data: 0.065

Record Nps(K) 0.08 for dash number from Aerojet specification AE-24869, Table II.
Accept units if calculated Nps(K) is less than or equal to specified Nps(K), otherwise reject.

ACC QA 1 REJ

DATE ACC REJ

PART NO. 1331562-156 SPACEK QA 1-21-98 QA 1

SER NO. 7A15 TEST FAILURE:

TESTED BY: DA FAILURE ANALYSIS NO.

END DATE: 1-19-98

END TIME: 1600

Spacek Labs, Inc.
212 E. Gutierrez St.
Santa Barbara, CA, 93101

Channel 6 Mixer/Amplifier

Mixer/Amplifier (P/N: 1331562-16, S/N: 7A16)

TEST DATA SHEET NO. 6. AMPLIFIER TESTS

GAIN FLATNESS TEST: ATP PARAGRAPH 5.1.3

GAIN FLATNESS (dB)ppK	SPEC. GAIN FLATNESS (dB)ppK	ACC	REJ
0.25	0.5	QA 1	—

GAIN VERSUS VOLTAGE SENSITIVITY TEST: ATP PARAGRAPH 5.1.4

AMPLIFIER VOLTAGE	GAIN READING (dBm)	ΔG/ΔV	SPEC. ΔG/ΔV	ACC	REJ
10.04	71.15	2.875	2.0	—	QA 1
10.00	71.05				
9.96	70.92				
ΔGv =	0.23 dB				

	DATE	ACC	REJ
SPACEK QA	4-21-97	—	QA 1

PART NO. 1331562-16F

SER NO. 7A16

TESTED BY: [signature]

END DATE: 4-21-97

END TIME: 1600

TEST FAILURE: _____

FAILURE ANALYSIS NO. _____

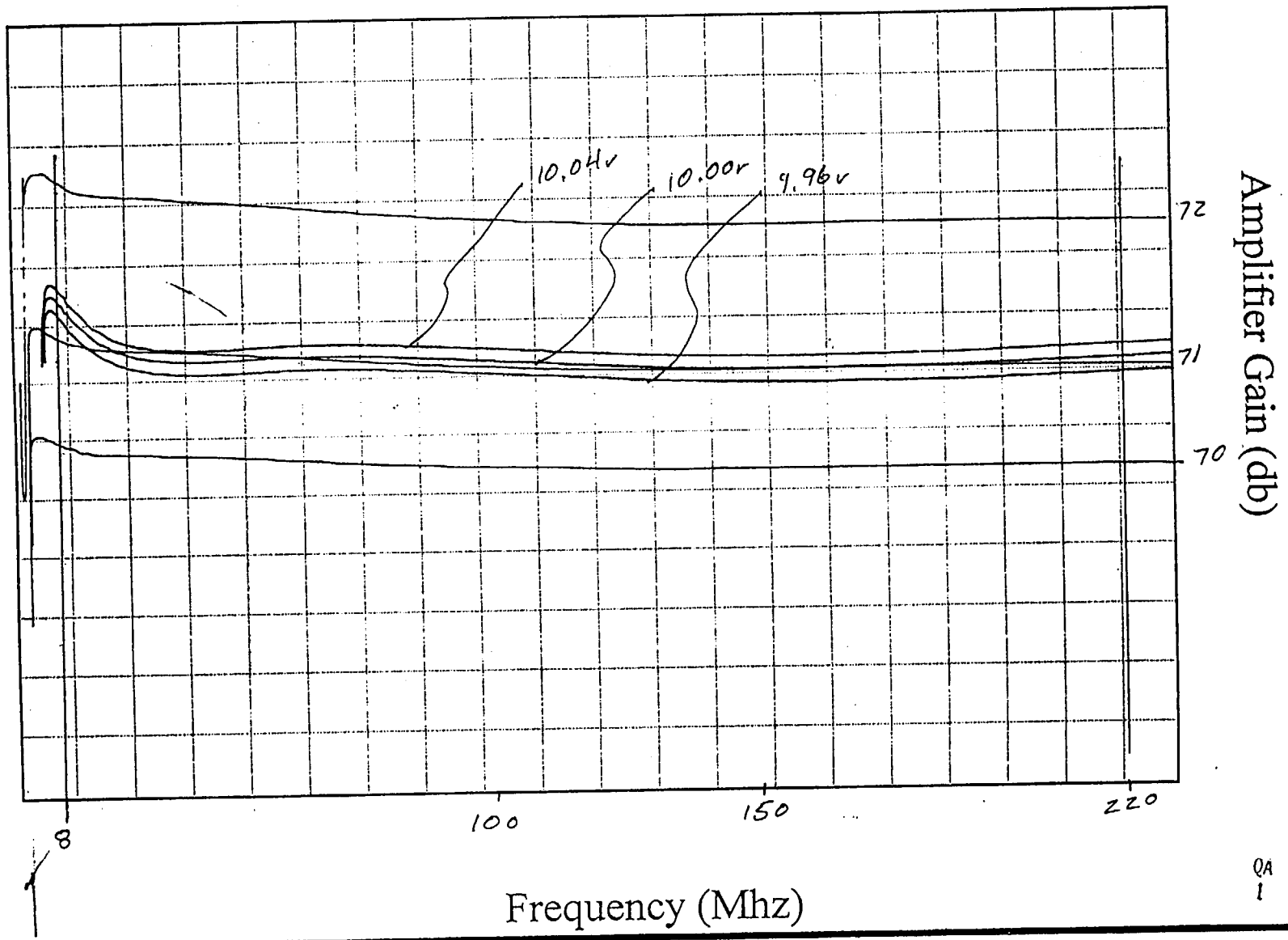
Spacek Labs, Inc.
212 E. Gutierrez St.
Santa Barbara,CA,93101

SPACEK LABS, INC.
MM-WAVE TECHNOLOGY

Model No. 1331562-16G
Serial No. 7A16
Date 4-21-97
Tested By [illegible]

Amplifier Gain

+23°C



QA
1

TEST DATA SHEET NO. 7. AMPLIFIER TESTS

GAIN VERSUS TEMPERATURE SENSITIVITY TEST: ATP PARAGRAPH 5.1.5

Nominal Temperature (°C)	Relative Gain	ΔG/ΔT	SPEC	ACC	REJ
T1 +40	G_{T1} 70.57				
		* .036	0.035dB/°C		QA 1
T2 +28	G_{T2} 71.00				
		* .026	0.020dB/°C		QA 1
T3 +8	G_{T3} 71.52				
		* .020	0.035dB/°C	QA 1	
T4 −6	G_{T4} 71.80				

* Perform the following calculations and record on the TDS

$$\Delta G/\Delta T = \frac{G_{Ti} - G_{Ti+1}}{T_i - T_{i+1}} \quad i = 1,2,3,4$$

ΔG_T = 1.28 d3

$\Delta G_{TOTAL} = \Delta G_V + \Delta G_T + 0.4$ = 1.91 dB Spec 1.4dB ACC____ REJ QA 1

	DATE	ACC	REJ
PART NO. 1331562-165	SPACEK QA	11-24-97	QA 1

SER NO. 7A16

TESTED BY: TTW

END DATE: 4-24-97

END TIME: 4:00pm

TEST FAILURE: _____

FAILURE ANALYSIS NO. _____

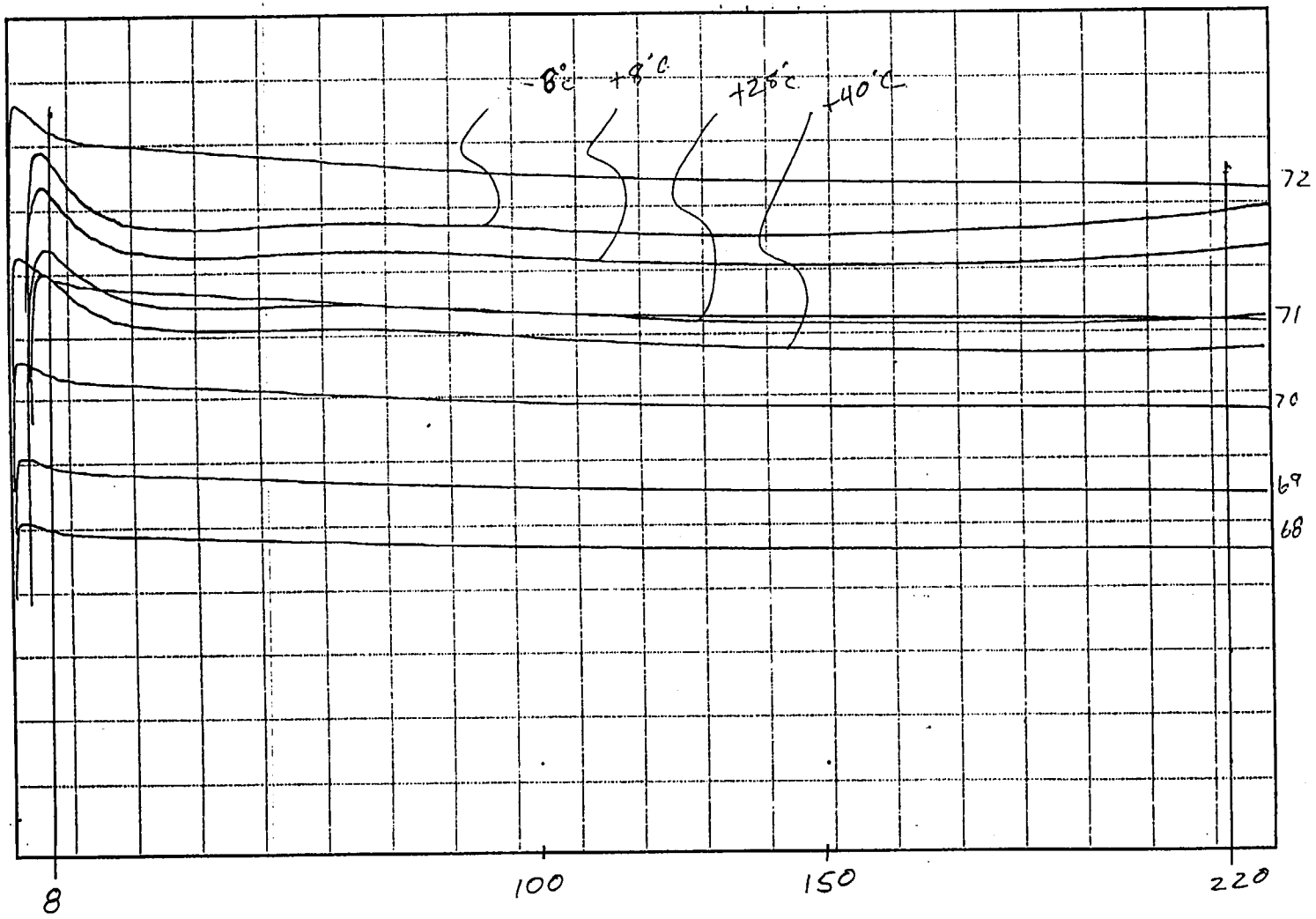
Spacek Labs, Inc.
212 E. Gutierrez St.
Santa Barbara, CA, 93101

SPACEK LABS, INC.
MM-WAVE TECHNOLOGY

Amplifier Gain

Model No. 1331562-17G
Serial No. 7A16
Date 4-24-97
Tested By -77-

Amb Temp +23°C



QA 1

TEST DATA SHEET NO. 8. AMPLIFIER TESTS

OUTPUT 1.0 dB COMPRESSION POINT TEST: ATP PARAGRAPH 5.1.6

DASH #

11	12	13	14	15	16	17	18	19	20	FREQ. (MHz)	P2 COMP (dBm)	OUTPUT COMP. at+10(dBm)	SPEC. COMP. PT.(dBm)	ACC	REJ
X	X	X	X		X	X	X	X		10	-2.3	0.7	1.0	QA	
				X						20	—	—	—		
	X	X								50	—	—	—		
X	X	X	X	X	X	X	X			100	-2.3	0.7	1.0	QA	
X										150	—	—	—		
			X	X	X	X	X	X		200	-2.2	0.8	1.0	QA	
								X		400					
									X	500					
									X	1000					
									X	1500					

AMPLIFIER NOISE FIGURE AND TOTAL POWER TEST: ATP PARAGRAPH 5.1.7

DATE: 4-20-97 AMBIENT ROOM TEMPERATURE °C: 23

AMPLIFIER OUTPUT POWER AMBIENT (dBm)	AMPLIFIER OUTPUT POWER (-77 K)(dBm)	Y FACTOR (dB)	AMPLIFIER NOISE FIGURE (dB)
-19.7	-23.5	3.6	1.20

Above data taken with Daden filter attached (except -19) .

Intermediate test results for information only

PART NO. 1331562-16G

SER NO. 7A16

TESTED BY: [signature]

END DATE: 4-20-97

END TIME: 4:00pm

SPACEK QA DATE 4-20-97 ACC QA REJ

TEST FAILURE: _____

FAILURE ANALYSIS NO. _____

Spacek Labs, Inc.
212 E. Gutierrez St.
Santa Barbara,CA,93101

TEST DATA SHEET NO. 13. MIXER-AMPLIFIER ASSEMBLY TESTS

NOISE FIGURE, TOTAL POWER AND CURRENT VS. TEMPERATURE TEST: ATP PARA 5.4.8.

DATE: 1-5-98 AMBIENT ROOM TEMPERATURE °C: +22

UUT TEMP °C.	UUT CURRENT	MIXER-AMP. OUTPUT POWER (AMBIENT) (dBm)	MIXER-AMP. OUTPUT POWER (77 DEG K) (dBm)	Y FACTOR (dB)	MIXER-AMP. NOISE FIGURE (dB)	SPEC. MIXER-AMP. NOISE FIGURE (dB)	ACC	REJ
-6	43.0	-18.40	-20.30	1.90	3.3	3.8	QA 1	
+8	43.1	-18.50	-20.40	1.90	3.3	3.8	QA 1	
+28	43.1	-18.80	-20.70	1.90	3.3	3.8	QA 1	
+40	43.2	-19.00	-20.90	1.90	3.3	3.8	QA 1	

Noise figure change 0 dB Spec is .3dB peak to peak on -11 thru -19 dB Spec is .5dB peak to peak on -20 ACC SL REJ

NOTE: *Above data to be taken with the Daden filter, except on the -19 unit.*

NEΔT-NOISE POWER STABILITY TEST: ATP PARAGRAPH 5.4.9

Date: 1-19-98 Ambient Room Temperature °C: 23

Attach computer generated *NEΔT* spreadsheet to this test data sheet.

Record the calculated Nps(K) from spreadsheet data: 0.052

Record Nps(K) 0.08 w/m for dash number from Aerojet specification AE-24869, Table II.
Accept units if calculated Nps(K) is less than or equal to specified Nps(K), otherwise reject.

ACC QA 1 REJ

	DATE	ACC	REJ
SPACEK QA	1-19-98	SL	

PART NO. 1331562-16F

SER NO. 7A16

TESTED BY: DH

END DATE: 1-19-98

END TIME: 1600

TEST FAILURE:

FAILURE ANALYSIS NO.

Spacek Labs, Inc.
212 E. Gutierrez St.
Santa Barbara,CA,93101

Channel 7 Mixer/Amplifier

Mixer/Amplifier (P/N: 1331562-17, S/N: 7A17)

TEST DATA SHEET NO. 6. AMPLIFIER TESTS

GAIN FLATNESS TEST: ATP PARAGRAPH 5.1.3

GAIN FLATNESS (dB)ppK	SPEC. GAIN FLATNESS (dB)ppK	ACC	REJ
0.32	0.5	QA 1	

GAIN VERSUS VOLTAGE SENSITIVITY TEST: ATP PARAGRAPH 5.1.4

AMPLIFIER VOLTAGE	GAIN READING (dBm)	ΔG/ΔV	SPEC. ΔG/ΔV	ACC	REJ
10.04	70.93	2.63	2.0		QA 1
10.00	70.85				
9.96	70.72				
ΔGv =	0.21 dB				

	DATE	ACC	REJ
PART NO. 1331562-176 SPACEK QA	4-21-97		QA 1

SER NO. 7A17 TEST FAILURE: _____

TESTED BY: [signature] FAILURE ANALYSIS NO. _____

END DATE: 4-21-97

END TIME: _____

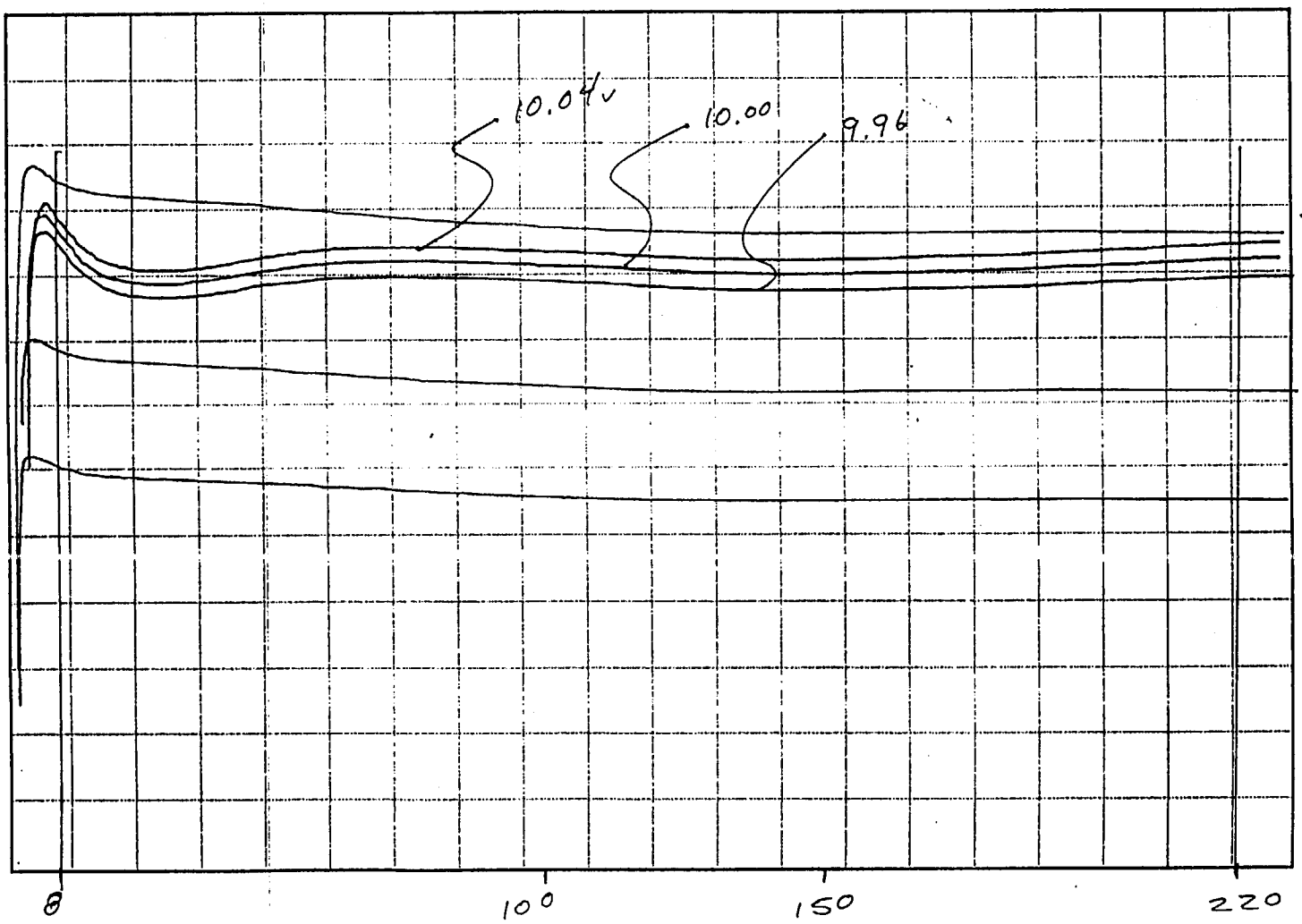
Spacek Labs, Inc.
212 E. Gutierrez St.
Santa Barbara,CA,93101

SPACEK LABS, INC.
MM-WAVE TECHNOLOGY

Model No. L331562 -17G
Serial No. 7A17
Date 4-21-97
Tested By 777

Amplifier Gain

+23°C



TEST DATA SHEET NO. 7. AMPLIFIER TESTS

GAIN VERSUS TEMPERATURE SENSITIVITY TEST: ATP PARAGRAPH 5.1.5

Nominal Temperature (°C)	Relative Gain	ΔG/ΔT	SPEC	ACC	REJ
T1 +40	G_{T1} 70.50				
		* 0.019	0.035dB/°C	QA 1	
T2 +28	G_{T2} 70.73				
		* 0.036	0.020dB/°C		QA 1
T3 +8	G_{T3} 71.45				
		* 0.214	0.035dB/°C	QA 1	
T4 −6	G_{T4} 71.75				

* Perform the following calculations and record on the TDS

$$\Delta G/\Delta T = \frac{G_{Ti} - G_{Ti+1}}{T_i - T_{i+1}} \quad i = 1,2,3,4 \qquad \Delta G_T = 1.25 \text{ dB}$$

$\Delta G_{TOTAL} = \Delta G_V + \Delta G_T + 0.4 = 1.86$ dB Spec 1.4dB ACC____ REJ QA 1

	DATE	ACC	REJ
PART NO. 1331562-125	SPACEK QA	4-24-97	QA 1

SER NO. 7A17 TEST FAILURE: _____

TESTED BY: [signature] FAILURE ANALYSIS NO. _____

END DATE: 4-24-97

END TIME: _____

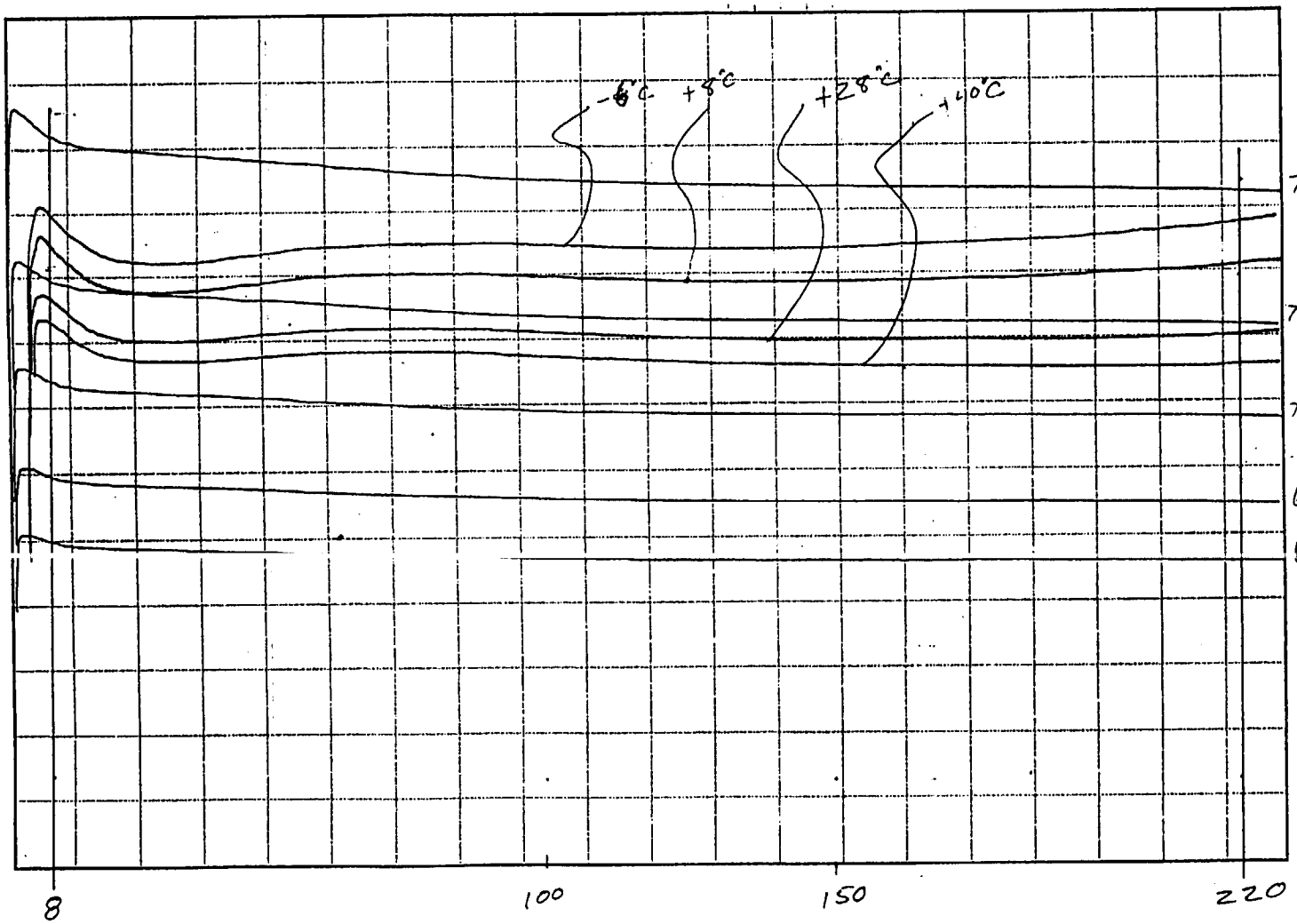
Spacek Labs, Inc.
212 E. Gutierrez St.
Santa Barbara,CA,93101

SPACEK LABS, INC.
MM-WAVE TECHNOLOGY

Amplifier Gain

Model No. 133562-176
Serial No. 7A17
Date 4-24-97
Tested By [illegible]

Amb Temp +23°C



QA
1

TEST DATA SHEET NO. 8. AMPLIFIER TESTS

OUTPUT 1.0 dB COMPRESSION POINT TEST: ATP PARAGRAPH 5.1.6

DASH #

11	12	13	14	15	16	17	18	19	20	FREQ. (MHz)	P2 COMP (dBm)	OUTPUT COMP. at+10(dBm)	SPEC. COMP. PT.(dBm)	ACC	REJ
X	X	X	X		X	X	X	X		10	-2.3	0.7	1.0	QA 1	
				X						20	–	–	–		
	X	X								50	–	–	–		
X	X	X	X	X	X	X	X			100	-2.5	0.5	1.0	QA 1	
X										150	–	–	–		
			X	X	X	X	X	X		200	-2.5	0.5	1.0	QA 1	
								X		400					
									X	500					
									X	1000					
									X	1500					

AMPLIFIER NOISE FIGURE AND TOTAL POWER TEST: ATP PARAGRAPH 5.1.7

DATE: 4-20-97 AMBIENT ROOM TEMPERATURE °C: 23

AMPLIFIER OUTPUT POWER AMBIENT (dBm)	AMPLIFIER OUTPUT POWER (-77 K)(dBm)	Y FACTOR (dB)	AMPLIFIER NOISE FIGURE (dB)
-19.9	-23.5	3.6	1.17

Above data taken with Daden filter attached (except -19) .

Intermediate test results for information only

PART NO. 1331562-176

SER NO. 7A17

TESTED BY: [illegible]

END DATE: 4-24-97

END TIME: 4:00 pm

	DATE	ACC	REJ
SPACEK QA	4-24-97	QA 1	

TEST FAILURE: _____

FAILURE ANALYSIS NO. _____

Spacek Labs, Inc.
212 E. Gutierrez St.
Santa Barbara,CA,93101

TEST DATA SHEET NO. 13. MIXER-AMPLIFIER ASSEMBLY TESTS

NOISE FIGURE, TOTAL POWER AND CURRENT VS. TEMPERATURE TEST: ATP PARA 5.4.8.

DATE: 1-5-98 AMBIENT ROOM TEMPERATURE °C: +22

UUT TEMP °C.	UUT CURRENT	MIXER-AMP. OUTPUT POWER (AMBIENT) (dBm)	MIXER-AMP. OUTPUT POWER (77 DEG K) (dBm)	Y FACTOR (dB)	MIXER-AMP. NOISE FIGURE (dB)	SPEC. MIXER-AMP. NOISE FIGURE (dB)	ACC	REJ
-6	42.7	-19.10	-21.15	2.05	3.0	3.8	QA 1	
+8	42.8	-19.30	-21.30	2.00	3.1	3.8	QA 1	
+28	42.9	-19.60	-21.60	2.00	3.1	3.8	QA 1	
+40	42.9	-20.00	-22.00	3.00 ~~2.15~~ dB	3.1	3.8	QA 1	

Noise figure change 0.1 dB Spec is .5dB peak to peak on -20 Spec is .3dB peak to peak on -11 thru -19 dB ACC QA 1 REJ

NOTE: *Above data to be taken with the Daden filter, except on the -19 unit.*

NEΔT-NOISE POWER STABILITY TEST: ATP PARAGRAPH 5.4.9

Date: 1-19-98 Ambient Room Temperature °C: 23

Attach computer generated *NEΔT* spreadsheet to this test data sheet.

Record the calculated Nps(K) from spreadsheet data: 0.058

Record Nps(K) 0.08 for dash number from Aerojet specification AE-24869, Table II.
Accept units if calculated Nps(K) is less than or equal to specified Nps(K), otherwise reject.

ACC QA 1 REJ

	DATE	ACC	REJ
SPACEK QA	1-19-98	QA 1	

PART NO. 1331562-175

SER NO. 7A17

TESTED BY: [illegible]

END DATE: 1-19-98

END TIME: 1600

TEST FAILURE:

FAILURE ANALYSIS NO.

Spacek Labs, Inc.
212 E. Gutierrez St.
Santa Barbara, CA, 93101

Channel 8 Mixer/Amplifier

Mixer/Amplifier (P/N: 1331562-18, S/N: 7A18)

TEST DATA SHEET NO. 6. AMPLIFIER TESTS

GAIN FLATNESS TEST: ATP PARAGRAPH 5.1.3

GAIN FLATNESS (dB)ppK	SPEC. GAIN FLATNESS (dB)ppK	ACC	REJ
0.4	0.5	QA 1	

GAIN VERSUS VOLTAGE SENSITIVITY TEST: ATP PARAGRAPH 5.1.4

AMPLIFIER VOLTAGE	GAIN READING (dBm)	ΔG/ΔV	SPEC. ΔG/ΔV	ACC	REJ
10.04	71.21	2.25	2.0		QA 1
10.00	71.08				
9.96	71.03				
ΔGv =	0.18 dB				

DATE ACC REJ

PART NO. 1331562-186 SPACEK QA 10-28-97 QA 1

SER NO. 7A18 TEST FAILURE:

TESTED BY: DFF FAILURE ANALYSIS NO.

END DATE: 10-28-97

END TIME: 4:00 pm

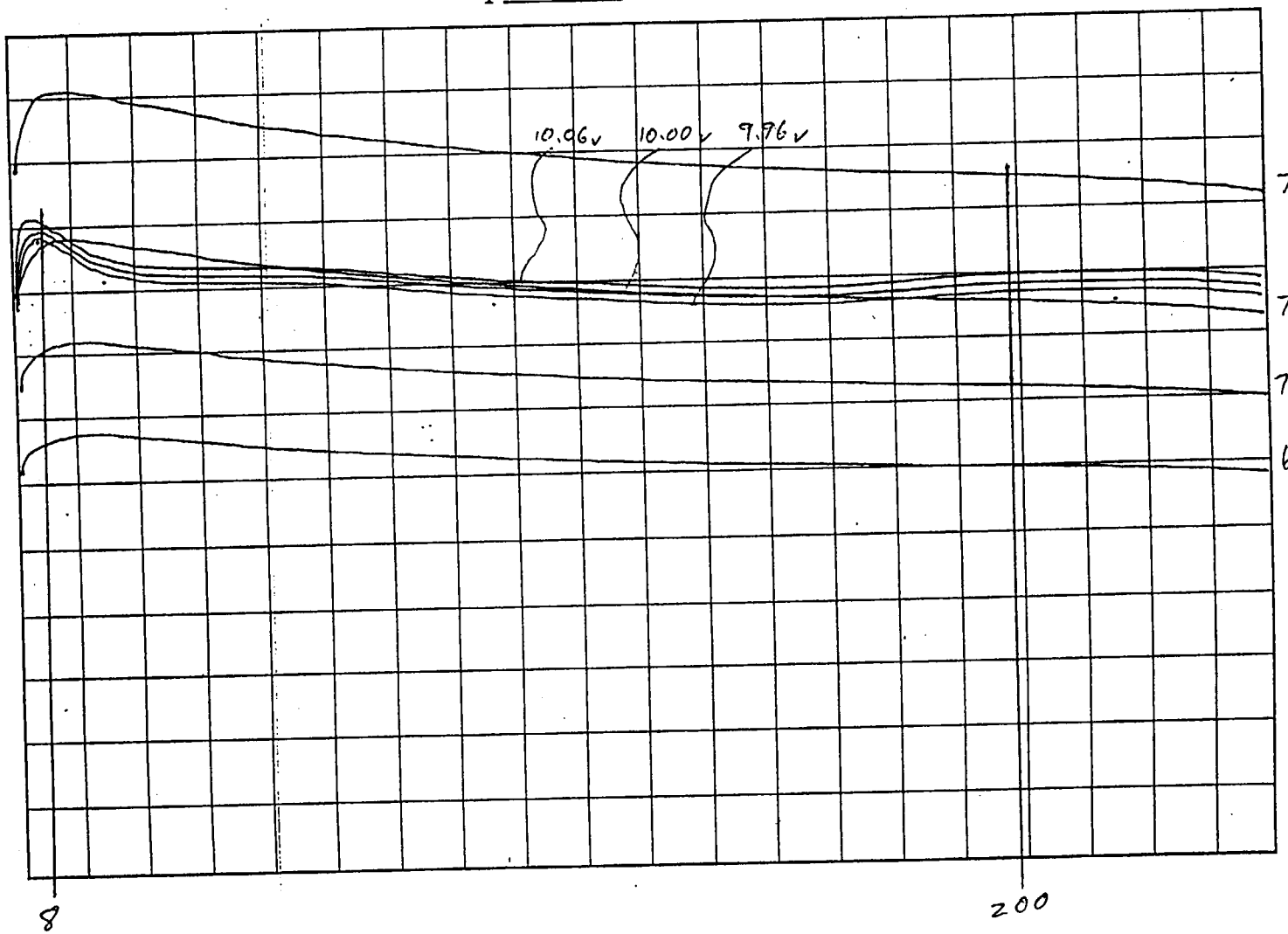
Spacek Labs, Inc.
212 E. Gutierrez St.
Santa Barbara,CA,93101

SPACEK LABS, INC.
MM-WAVE TECHNOLOGY

Amplifier Gain

Model No. 1331562-18 B
Serial No. 7A18
Date 10-21-97
Tested By 777

Amb Temp 23°C



QA 1

TEST DATA SHEET NO. 7. AMPLIFIER TESTS

GAIN VERSUS TEMPERATURE SENSITIVITY TEST: ATP PARAGRAPH 5.1.5

Nominal Temperature (°C)	Relative Gain	ΔG/ΔT	SPEC	ACC	REJ
T1 +40	G_{T1} 70.50				
		* .038	0.035dB/°C		QA 1
T2 +28	G_{T2} 70.95				
		* .028	0.020dB/°C		QA 1
T3 +8	G_{T3} 71.50				
		* .023	0.035dB/°C	QA 1	
T4 −6	G_{T4} 71.82				

* Perform the following calculations and record on the TDS

$$\Delta G/\Delta T = \frac{G_{Ti} - G_{Ti+1}}{T_i - T_{i+1}} \quad i = 1,2,3,4 \qquad \Delta G_T = \underline{1.32}\ \text{dB}$$

$\Delta G_{TOTAL} = \Delta G_V + \Delta G_T + 0.4 =$ 1.90 dB Spec 1.4dB ACC:____ REJ: QA 1

	DATE	ACC	REJ
PART NO. 1331562-186	SPACEK QA	10-28-97	QA 1

SER NO. 7A18 TEST FAILURE: _____

TESTED BY: [signature] FAILURE ANALYSIS NO. _____

END DATE: 10-28-97

END TIME: 4:00 pm

Spacek Labs, Inc.
212 E. Gutierrez St.
Santa Barbara,CA,93101

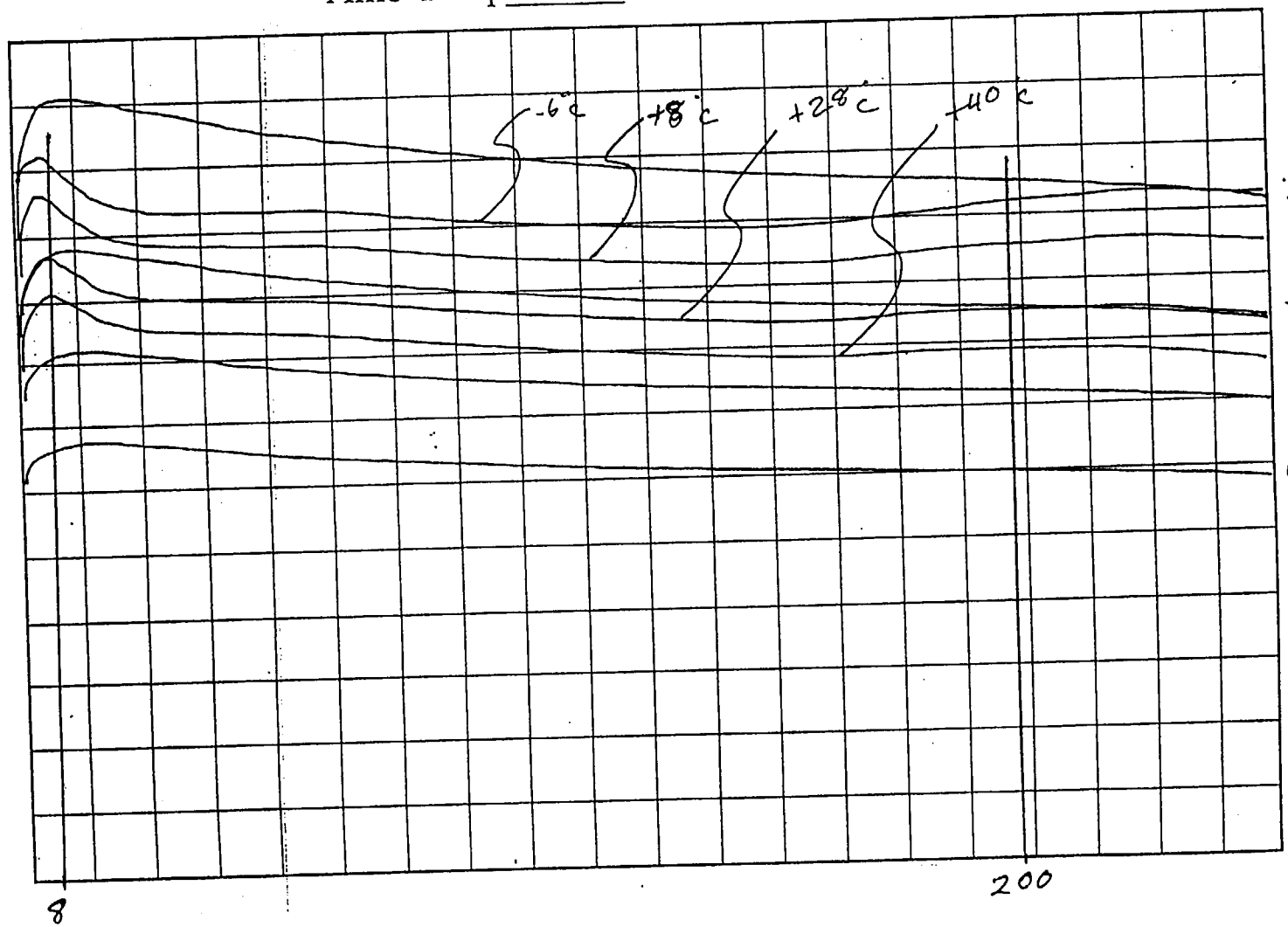
In chamber

SPACEK LABS, INC.
MM-WAVE TECHNOLOGY

Amplifier Gain

Model No. 1331562-18 G
Serial No. 7A18
Date 10-21-97
Tested By JJ

Amb Temp 23°C



QA 1

TEST DATA SHEET NO. 8. AMPLIFIER TESTS

OUTPUT 1.0 dB COMPRESSION POINT TEST: ATP PARAGRAPH 5.1.6

DASH #

11	12	13	14	15	16	17	18	19	20	FREQ. (MHz)	P2 COMP (dBm)	OUTPUT COMP. at+10(dBm)	SPEC. COMP. PT.(dBm)	ACC	REJ
X	X	X	X		X	X	X	X		10	-23	0.7	1.0	QA	
				X						20	—	—	—		
	X	X								50	—	—	—		
X	X	X	X	X	X	X	X			100	-2.5	0.5	1.0	QA	
X										150	—	—	—		
			X	X	X	X	X	X		200	-2.4	0.6	1.0	QA	
							X			400					
								X		500					
								X		1000					
								X		1500					

AMPLIFIER NOISE FIGURE AND TOTAL POWER TEST: ATP PARAGRAPH 5.1.7

DATE: 10-28-97 AMBIENT ROOM TEMPERATURE °C: 23

AMPLIFIER OUTPUT POWER AMBIENT (dBm)	AMPLIFIER OUTPUT POWER (-77 K)(dBm)	Y FACTOR (dB)	AMPLIFIER NOISE FIGURE (dB)
-19.9	-23.5	3.6	1.19

Above data taken with Daden filter attached (except -19) .

Intermediate test results for information only

		DATE	ACC	REJ
PART NO. 1331562-18G	SPACEK QA	10-28-97	QA	
SER NO. 7A18	TEST FAILURE:			
TESTED BY: [signature]	FAILURE ANALYSIS NO.			
END DATE: 10-28-97				
END TIME: 4:00pm				

Spacek Labs, Inc.
212 E. Gutierrez St.
Santa Barbara,CA,93101

TEST DATA SHEET NO. 13. MIXER-AMPLIFIER ASSEMBLY TESTS

NOISE FIGURE, TOTAL POWER AND CURRENT VS. TEMPERATURE TEST: ATP PARA 5.4.8.

DATE: 1-21-98 AMBIENT ROOM TEMPERATURE °C: +22

UUT TEMP °C.	UUT CURRENT	MIXER-AMP. OUTPUT POWER (AMBIENT) (dBm)	MIXER-AMP. OUTPUT POWER (77 DEG K) (dBm)	Y FACTOR (dB)	MIXER-AMP. NOISE FIGURE (dB)	SPEC. MIXER-AMP. NOISE FIGURE (dB)	ACC	REJ
-6	42.7	-19.10	-21.00	1.90	3.3	3.8	QA 1	
+8	42.7	-19.20	-21.05	1.85	3.4	3.8	QA 1	
+28	42.8	-19.40	-21.25	1.85	3.4	3.8	QA 1	
+40	42.9	-19.60	-21.40	1.80	3.5	3.8	QA 1	

Noise figure change 0.2 dB Spec is .3dB peak to peak on -11 thru -19 Spec is .5dB peak to peak on -20 ACC QA 1 REJ

NOTE: *Above data to be taken with the Daden filter, except on the -19 unit.*

NEΔT-NOISE POWER STABILITY TEST: ATP PARAGRAPH 5.4.9

Date: 1-19-98 Ambient Room Temperature °C: 23

Attach computer generated *NEΔT* spreadsheet to this test data sheet.

Record the calculated Nps(K) from spreadsheet data: 0.041

Record Nps(K) 0.08 for dash number from Aerojet specification AE-24869, Table II.
Accept units if calculated Nps(K) is less than or equal to specified Nps(K), otherwise reject.

ACC QA 1 REJ

	DATE	ACC	REJ
SPACEK QA	1-19-98	QA 1	

PART NO. 1331562-186

SER NO. 7A18

TESTED BY: RDA

END DATE: 1-19-98

END TIME: 1600

TEST FAILURE:

FAILURE ANALYSIS NO.

Spacek Labs, Inc.
212 E. Gutierrez St.
Santa Barbara,CA,93101

Channels 9-14 Mixer/Amplifier

Mixer/Amplifier (P/N: 1331562-19, S/N: 7A19)

TEST DATA SHEET NO. 6. AMPLIFIER TESTS

GAIN FLATNESS TEST: ATP PARAGRAPH 5.1.3

GAIN FLATNESS (dB)ppK	SPEC. GAIN FLATNESS (dB)ppK	ACC	REJ
0.35	0.5	QA 1	—

GAIN VERSUS VOLTAGE SENSITIVITY TEST: ATP PARAGRAPH 5.1.4

AMPLIFIER VOLTAGE	GAIN READING (dBm)	ΔG/ΔV	SPEC. ΔG/ΔV	ACC	REJ
10.04	60.95	2.5	2.0	—	QA 1
10.00	60.85				
9.96	60.75				
ΔGv =	0.2 dB				

	DATE	ACC	REJ
SPACEK QA	5-5-97	—	QA 1

PART NO. 1331562-196

SER NO. 7A19

TESTED BY: [signature]

END DATE: 4-25-97

END TIME: 1600

TEST FAILURE: _____

FAILURE ANALYSIS NO. _____

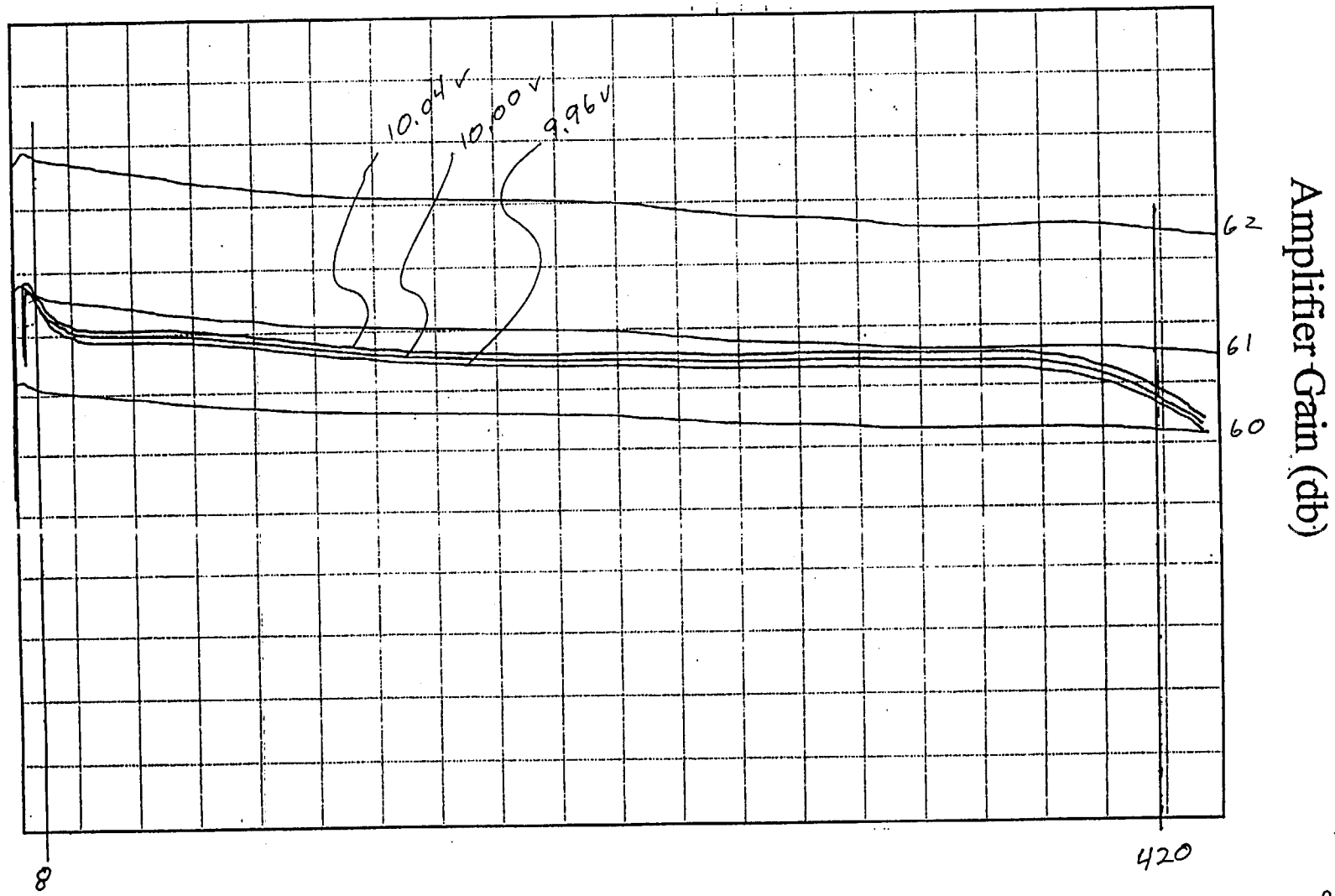
Spacek Labs, Inc.
212 E. Gutierrez St.
Santa Barbara,CA,93101

SPACEK LABS, INC.
MM-WAVE TECHNOLOGY

Amplifier Gain

Model No. 133562-19
Serial No. 7A19
Date 4-25-97
Tested By ZT

Amb Temp 23°C



QA
1

TEST DATA SHEET NO. 7. AMPLIFIER TESTS

GAIN VERSUS TEMPERATURE SENSITIVITY TEST: ATP PARAGRAPH 5.1.5

Nominal Temperature (°C)	Relative Gain	ΔG/ΔT	SPEC	ACC	REJ
T1 +40	G_{T1} 59.65				
		* .058	0.035dB/°C		QA 1
T2 +28	G_{T2} 60.35				
		* .045	0.020dB/°C		QA 1
T3 +8	G_{T3} 61.25				
		* .018	0.035dB/°C	QA 1	
T4 −6	G_{T4} 61.5				

* Perform the following calculations and record on the TDS

$$\Delta G/\Delta T = \frac{G_{Ti} - G_{Ti+1}}{T_i - T_{i+1}} \quad i = 1,2,3,4 \qquad \Delta G_T = 1.85 \text{ dB}$$

$\Delta G_{TOTAL} = \Delta G_V + \Delta G_T + 0.4 =$ 2.45 dB Spec 1.4dB ACC____ REJ QA 1

	DATE	ACC	REJ
SPACEK QA	5-5-97	___	QA 1

PART NO. 1331562-19G

SER NO. 7A19

TESTED BY: [signature]

END DATE: 4-24-97

END TIME: 1630

TEST FAILURE: _____

FAILURE ANALYSIS NO. _____

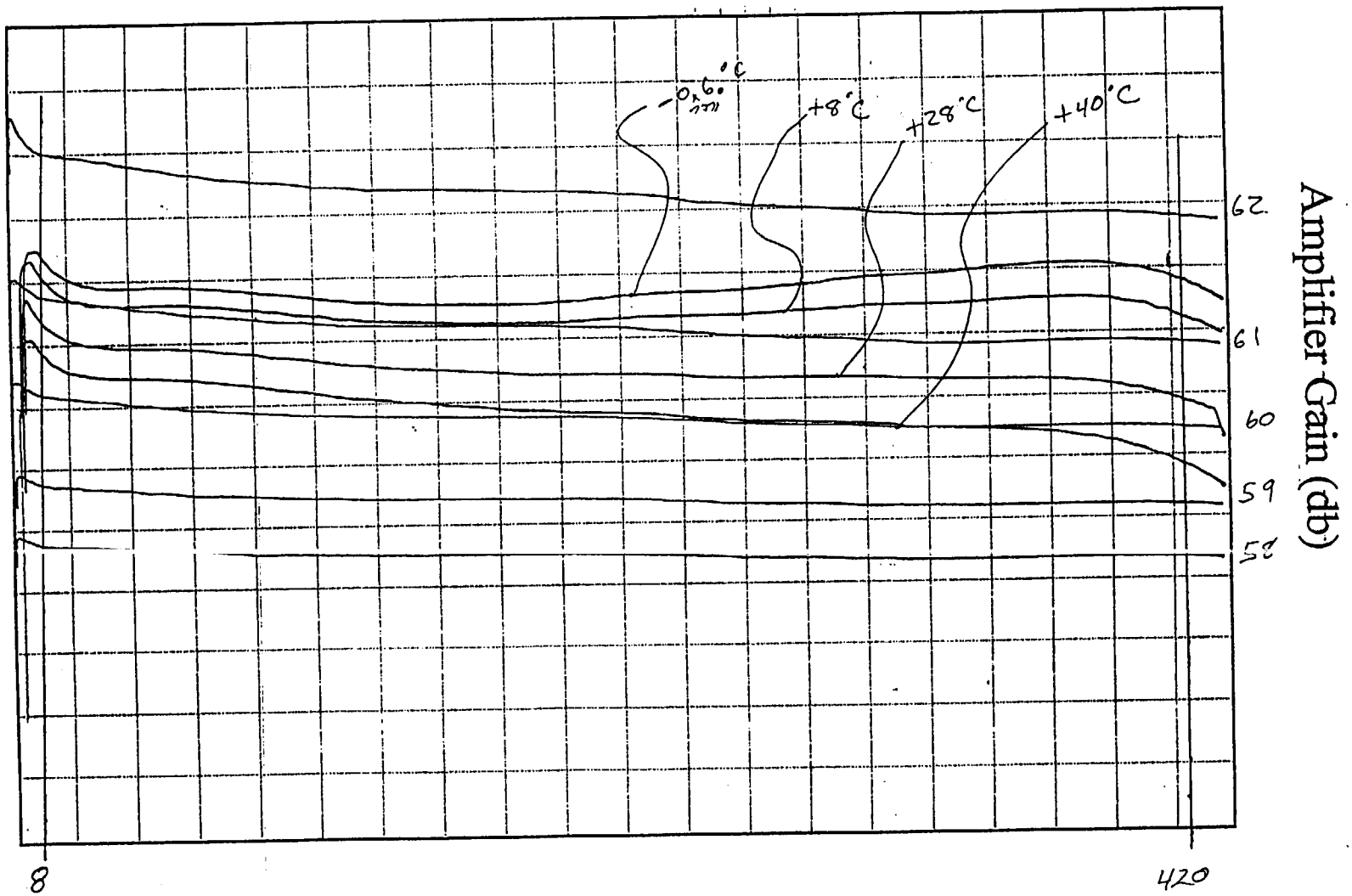
Spacek Labs, Inc.
212 E. Gutierrez St.
Santa Barbara,CA,93101

SPACEK LABS, INC.
MM-WAVE TECHNOLOGY

Amplifier Gain

Model No. 1331562-196
Serial No. 7A19
Date 4-24-97
Tested By TT

Amb Temp +23°C



QA
1

TEST DATA SHEET NO. 8. AMPLIFIER TESTS

OUTPUT 1.0 dB COMPRESSION POINT TEST: ATP PARAGRAPH 5.1.6

DASH #

11	12	13	14	15	16	17	18	19	20	FREQ. (MHz)	P2 COMP (dBm)	OUTPUT COMP. at+10(dBm)	SPEC. COMP. PT.(dBm)	ACC	REJ
X	X	X	X		X	X	X	X		10	-2.3	0.7	1.0	QA 1	
				X						20	—	—	—		
	X	X								50	—	—	—		
X	X	X	X	X	X	X	X			100	—	—	—		
X										150	—	—	—		
			X	X	X	X	X	X		200	-2.2	0.8	1.0	QA 1	
								X		400	-2.1	0.9	1.0	QA 1	
									X	500					
									X	1000					
									X	1500					

AMPLIFIER NOISE FIGURE AND TOTAL POWER TEST: ATP PARAGRAPH 5.1.7

DATE: 4-20-97 AMBIENT ROOM TEMPERATURE °C: 23

AMPLIFIER OUTPUT POWER AMBIENT (dBm)	AMPLIFIER OUTPUT POWER (-77 K)(dBm)	Y FACTOR (dB)	AMPLIFIER NOISE FIGURE (dB)
-25.3	-28.8	3.5	1.26

Above data taken with Daden filter attached (except -19) .

Intermediate test results for information only

DATE ACC REJ

PART NO. 1331562-19E SPACEK QA 5-5-97 QA 1

SER NO. 7A19 TEST FAILURE: _____

TESTED BY: [illegible] FAILURE ANALYSIS NO. _____

END DATE: 4-20-97

END TIME: 4:00pm

Spacek Labs, Inc.
212 E. Gutierrez St.
Santa Barbara,CA,93101

TEST DATA SHEET NO. 13. MIXER-AMPLIFIER ASSEMBLY TESTS

NOISE FIGURE, TOTAL POWER AND CURRENT VS. TEMPERATURE TEST: ATP PARA 5.4.8.

DATE: 1-21-98 AMBIENT ROOM TEMPERATURE °C: +22

UUT TEMP °C.	UUT CURRENT	MIXER-AMP. OUTPUT POWER (AMBIENT) (dBm)	MIXER-AMP. OUTPUT POWER (77 DEG K) (dBm)	Y FACTOR (dB)	MIXER-AMP. NOISE FIGURE (dB)	SPEC. MIXER-AMP. NOISE FIGURE (dB)	ACC	REJ
-6	43.6	-24.50	-26.55	2.05	3.0	3.5	QA 1	
+8	43.7	-24.80	-26.80	2.0	3.1	3.5	QA 1	
+28	43.7	-25.00	-27.00	2.0	3.1	3.5	QA 1	
+40	43.8	-25.10	-27.10	2.0	3.1	3.5	QA 1	

Spec is .3dB peak to peak on -11 thru -19

Noise figure change 0.1 dB Spec is .5dB peak to peak on -20 ACC QA REJ

NOTE: *Above data to be taken with the Daden filter, except on the -19 unit.*

NEΔT-NOISE POWER STABILITY TEST: ATP PARAGRAPH 5 4.9

Date: 1-19-98 Ambient Room Temperature °C: 23

Attach computer generated *NEΔT* spreadsheet to this test data sheet.

Record the calculated Nps(K) from spreadsheet data: 0.040

Record Nps(K) 0.07 for dash number from Aerojet specification AE-24869, Table II.
Accept units if calculated Nps(K) is less than or equal to specified Nps(K), otherwise reject.

ACC QA REJ

DATE ACC REJ

PART NO. 1331562-196 SPACEK QA 1-21-98 QA

SER NO. 7A19 TEST FAILURE:

TESTED BY: [illegible] FAILURE ANALYSIS NO.

END DATE: 1-21-98

END TIME: 1600

Spacek Labs, Inc.
212 E. Gutierrez St.
Santa Barbara CA,93101

Channel 9 Amplifier

IF Amplifier (P/N:1331579-8, S/N: 108)

APPENDIX C
ATP1772 DATA SHEET
MODEL NUMBER VD722301
AEROJET P/N 1331579-8

S/N 108

PARA	TEST	SPECIFICATION	+18°C	-4°C	+40°C	DATE
4.1.1	Examination of Product		Accept X Reject ___			2-13-97
4.2.2	* Current Limiting	200 mA maximum Reg. VOLTAGE= N/A VDC Total R= N/A ohm max. current draw =	N/A mA			N/A
4.4	Electrical Test					
4.4.1	* Polarity Reversal Protection	No Damage	Current N/A mA Accept N/A Reject ___			N/A
	Short Open Protection	No Damage	Accept X Reject ___			2-13-97
	Output Coupling	Output shall be AC coupled	Accept X Reject ___			2-13-97
4.4.2	Gain vs. Freq. 5 MHz to 200 MHz	14.5dB Min., 15.5dB Max. -4°C to +40°C Attach x-y plot	Max 15.05 dB Min 14.88 dB Accept X Reject ___	Max 15.00 dB Min 14.82 dB Accept X Reject ___	Max 15.10 dB Min 14.91 dB Accept X Reject ___	2-13-97
	Gain Flatness	.5 dB Maximum Worse Case	Accept X Reject ___ 0.17 dB	Accept X Reject ___ 0.18 dB	Accept X Reject ___ 0.19 dB	2-13-97
	Gain Temp. Sensitivity	±.22 dB from -4°C to +40°C Worse Case	Accept X Reject ___	Accept X Reject ___ 0.08 dB	Accept X Reject ___ 0.06 dB	2-13-97
4.4.3	Gain-Voltage Sensitivity	≤.5dB/v Worse Case ± .2dB for 7.6 to 8.4 Vdc	0.02 dB	0.02 dB	0.02 dB	
	Input Currents	40ma MAX. 7.6v 8.0v 8.4v Attach X-Y Plot	34.2 mA 34.9 mA 35.4 mA Accept X Reject ___	31.8 mA 32.7 mA 33.0 mA Accept X Reject ___	36.3 mA 36.9 mA 37.5 mA Accept X Reject ___	2-13-97

NOTE: * TEST REQUIRED ON PROTOFLIGHT UNIT ONLY

APPENDIX C
ATP1772 DATA SHEET
MODEL NUMBER VD722301
AEROJET P/N 1331579-8

S/N 108

PARA	TEST	SPECIFICATION	+18°C	-4°C	+40°C	DATE
4.4.7	Compression	1 dB maximum Compression AT +10 dBm Output Power	Accept X Reject ____			
		5 MHz	0.25 dB	0.40 dB	0.25 dB	
		102.5 MHz	0.25 dB	0.40 dB	0.20 dB	2-13-97
		200 MHz	0.15 dB	0.20 dB	0.15 dB	
4.4.8	Stability	Stable with the input terminated into a 2.5:1 mismatch and the output at all impedance's.	Accept X Reject ____			2-13-97
4.4.9	Start-up	Capable of starting operation at -30°C and +60°C with a maximum current draw of 45 mA	Accept X Reject ____			
		Maximum Current	38.5 mA			2-14-97

NOTE: Review all recorded data and signify acceptance below.

Technician Sh Hoon T143 Date: 2-14-97

Quality Assurance Lore Lara QC 176 Date: 2-18-97

CSI: Mike Lueck Date: 2-19-97

GSI: Maynie Thomas Date: 2/14/97

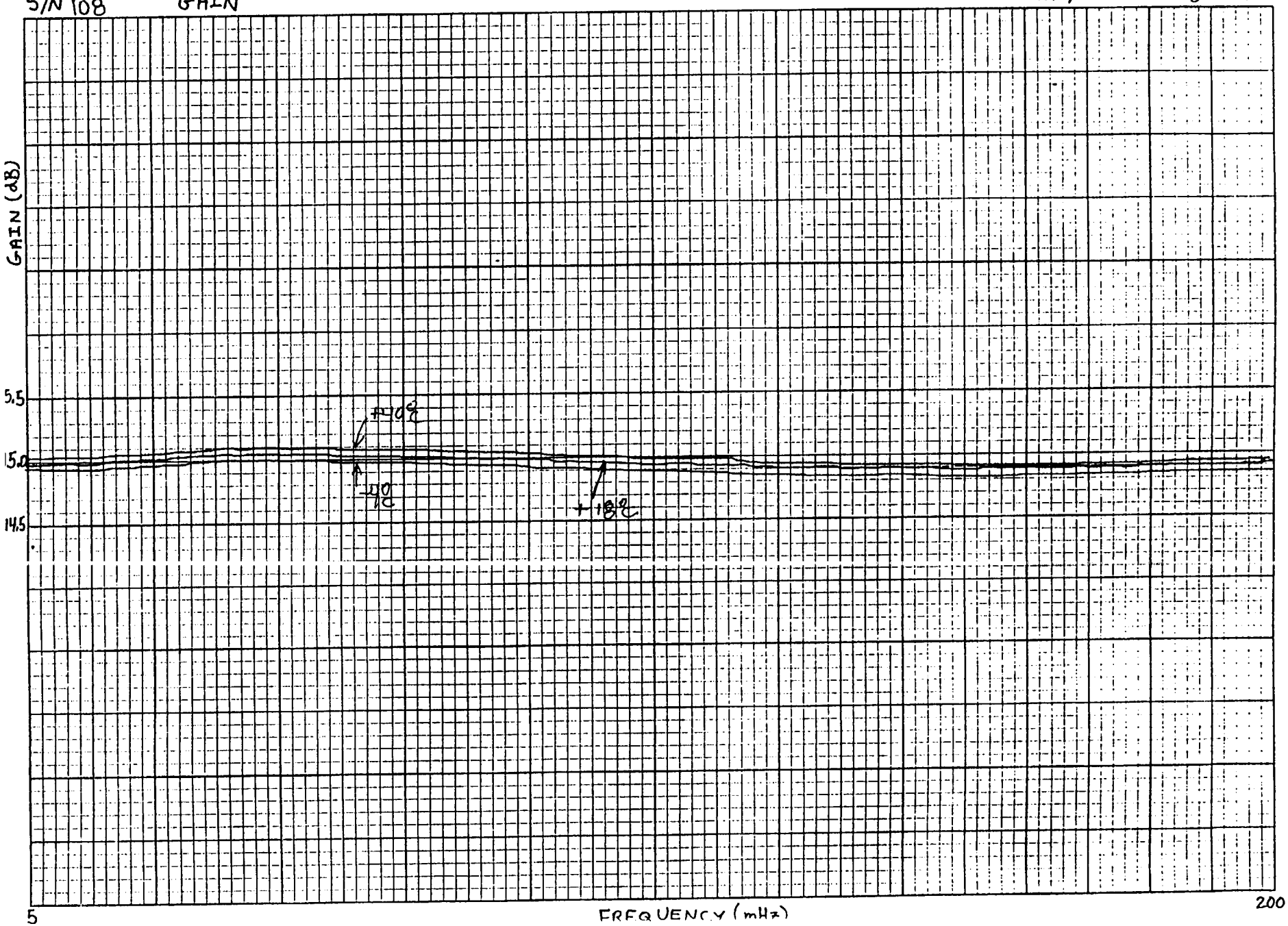
Amplica, Inc. Newbury Park, CA 91320	SIZE A	FSCM NO. 51025	ATP1772	REV.
DRAWN				
ISSUED	SCALE		SHEET 36 OF 38	

FORM 163

HEWLETT-PACKARD 9270-1007

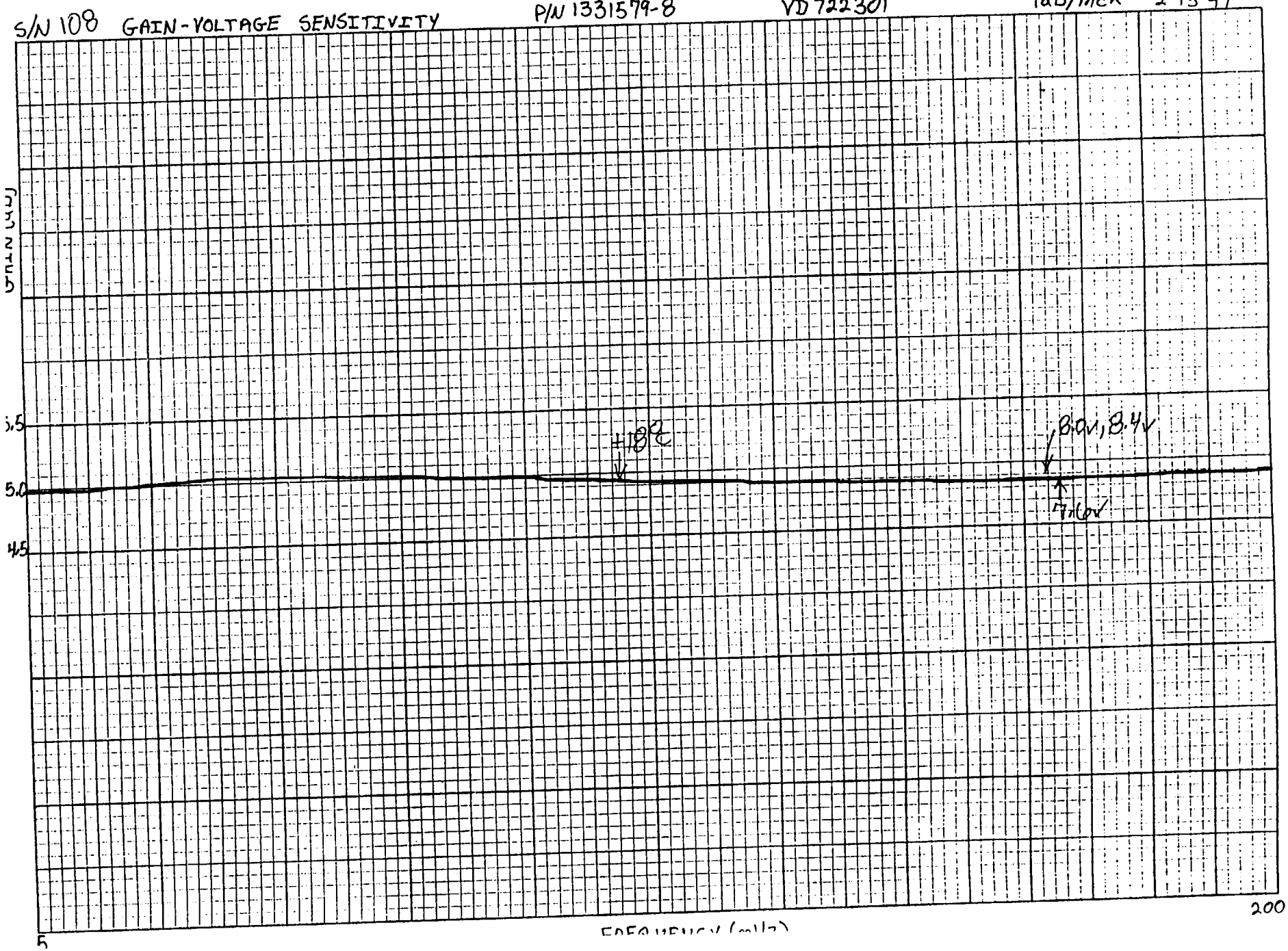
T143 Sht 2-13-97

S/N 108 GAIN P/N 1331579-8 VD722301 1dB/inch



(1143)

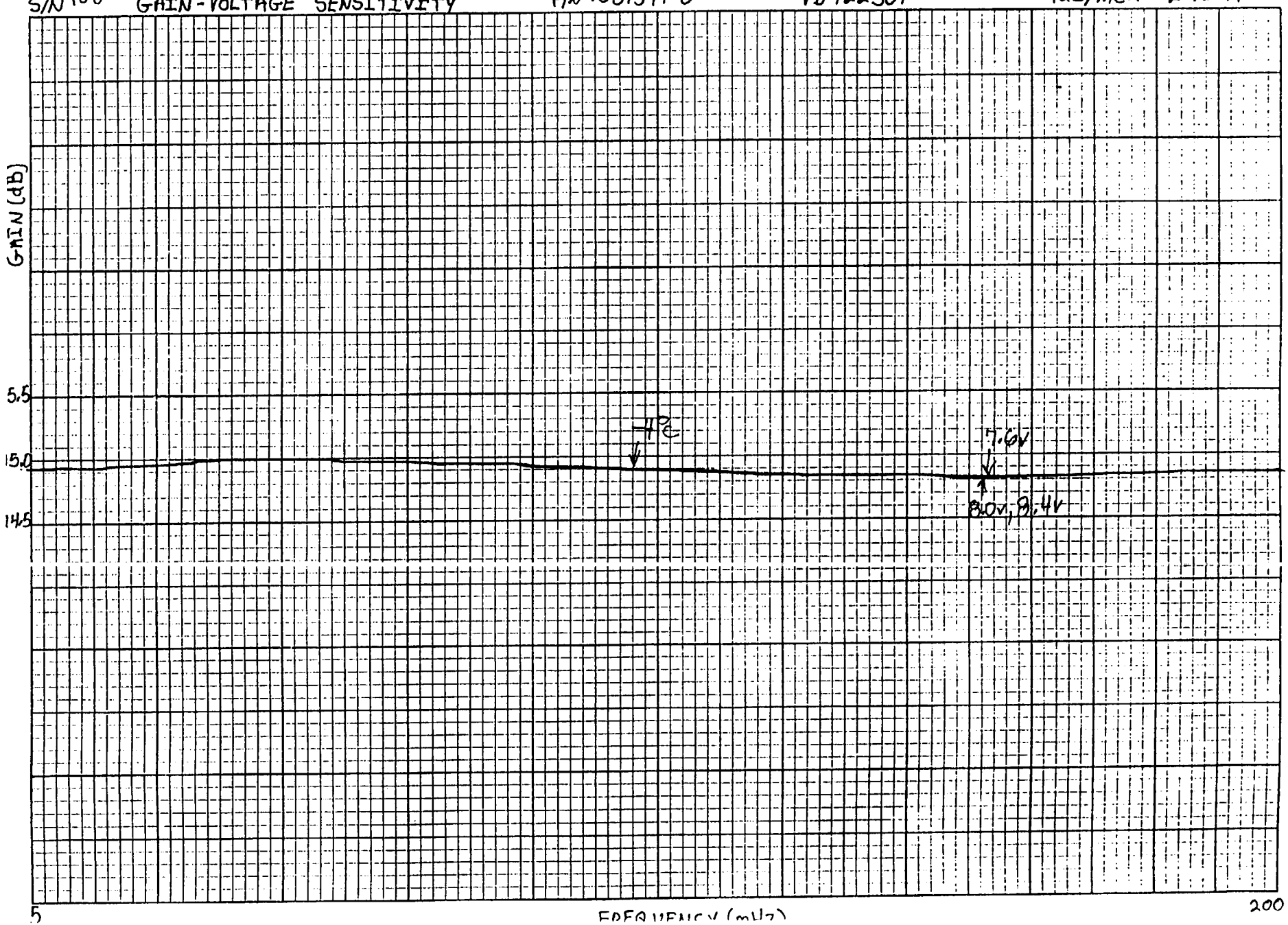
S/N 108 GAIN-VOLTAGE SENSITIVITY P/N 1331579-8 VD 722301 1dB/inch 2-13-97

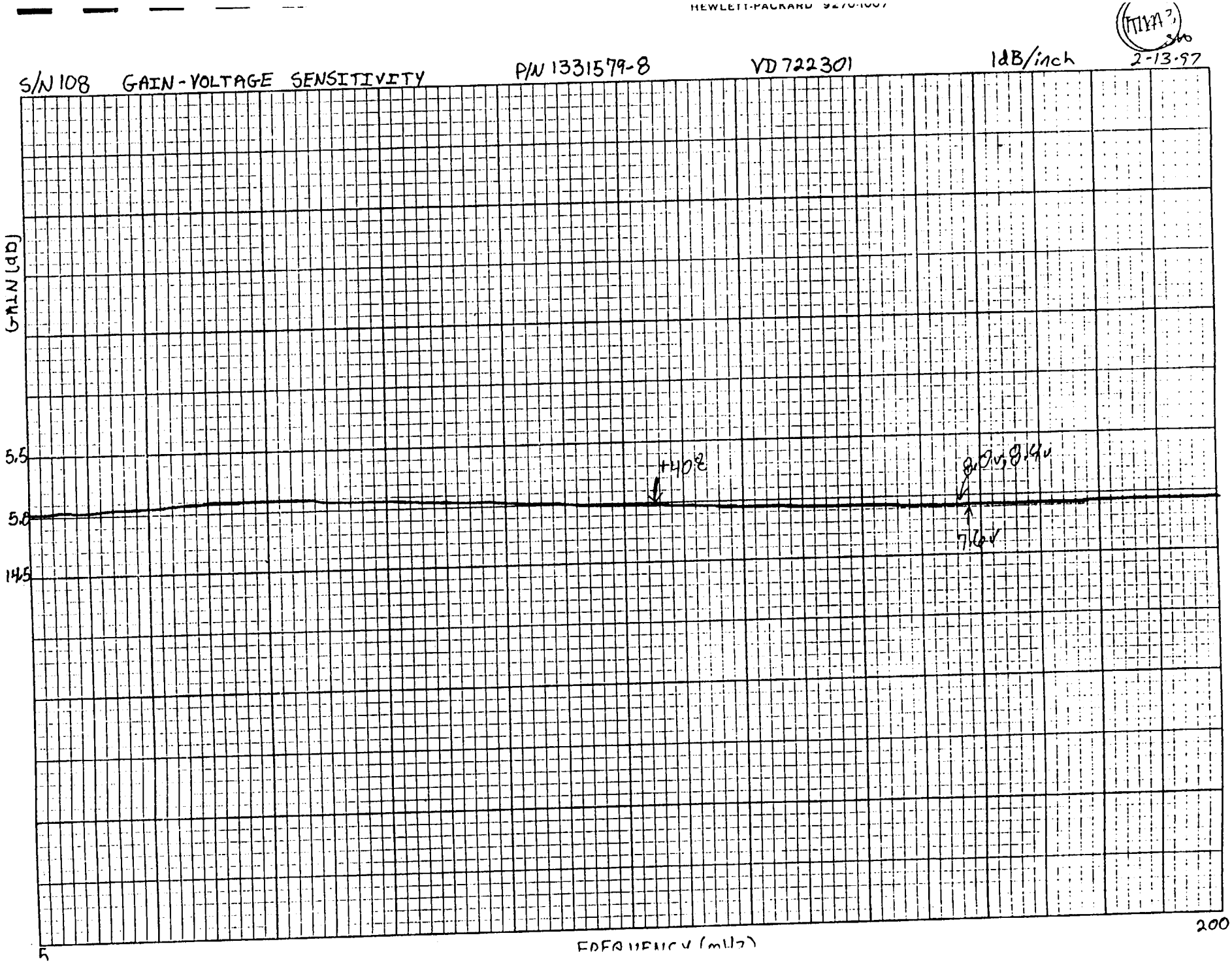


HEWLETT-PACKARD 9270-1007

T143

S/N 108 GAIN-VOLTAGE SENSITIVITY P/N 1331579-8 VD 722301 1dB/inch 2-13-97




S/N 108 GAIN-VOLTAGE SENSITIVITY
P/N 1331579-8
VD 722301
1dB/inch
2-13-97
GAIN (dB)
5.5
5.0
14.5
+40°F
8.0V, 8.4V
7.0V
5
200
FREQUENCY (mHz)

Channel 10 Amplifier

IF Amplifier (P/N:1331579-9, S/N: 108)

APPENDIX C
ATP1773 DATA SHEET
MODEL NUMBER VD622301
AEROJET P/N 1331579-9

S/N 108

PARA	TEST	SPECIFICATION	+18°C	-4°C	+40°C	DATE
4.1.1	Examination of Product		Accept X Reject			2-13-97
4.2.2	* Current Limiting	200 mA maximum Reg. VOLTAGE= N/A VDC Total R= N/A ohm max. current draw =	N/A mA			N/A
4.4	Electrical Test					
4.4.1	* Polarity Reversal Protection	No Damage	Current N/A mA Accept N/A Reject			N/A
	Short Open Protection	No Damage	Accept X Reject			2-13-97
	Output Coupling	Output shall be AC coupled	Accept X Reject			2-13-97
4.4.2	Gain vs. Freq. 150 MHz to 300 MHz	17.5dB Min., 18.5dB Max. -4°C to +40°C Attach x-y plot	Max 18.16 dB Min 17.98 dB Accept X Reject	Max 18.11 dB Min 17.94 dB Accept X Reject	Max 18.21 dB Min 17.98 dB Accept X Reject	2-13-97
	Gain Flatness	.5 dB Maximum Worse Case	Accept X Reject 0.18 dB	Accept X Reject 0.17 dB	Accept X Reject 0.23 dB	2-13-97
	Gain Temp. Sensitivity	±.22 dB from -4°C to +40°C Worse Case	Accept X Reject	Accept X Reject 0.07 dB	Accept X Reject 0.05 dB	2-13-97
4.4.3	Gain-Voltage Sensitivity Input Currents	≤.5dB/v Worse Case ± .2dB for 7.6 to 8.4 Vdc 7.6v 8.0v 8.4v 40ma MAX. Attach X-Y Plot	0.01 dB 35.8 mA 36.5 mA 37.1 mA Accept X Reject	0.02 dB 32.7 mA 33.5 mA 34.1 mA Accept X Reject	0.01 dB 38.2 mA 39.0 mA 39.6 mA Accept X Reject	2-13-97

NOTE: * TEST REQUIRED ON PROTOFLIGHT UNIT ONLY

APPENDIX C
ATP1773 DATA SHEET
MODEL NUMBER VD622301
AEROJET P/N 1331579-9

S/N 108

PARA	TEST	SPECIFICATION	+18°C	-4°C	+40°C	DATE
4.4.7	Compression	1 dB maximum Compression AT +10 dBm Output Power	Accept X Reject ____			
		150 MHz	0.20 dB	0.25 dB	0.20 dB	
		225 MHz	0.25 dB	0.30 dB	0.25 dB	
		300 MHz	0.25 dB	0.25 dB	0.30 dB	2-13-97
4.4.8	Stability	Stable with the input terminated into a 2.5:1 mismatch and the output at all impedance's.	Accept X Reject ____			2-13-97
4.4.9	Start-up	Capable of starting operation at -30°C and +60°C with a maximum current draw of 45 mA	Accept X Reject ____			
		Maximum Current	40.2 mA			2-14-97

NOTE: Review all recorded data and signify acceptance below.

Technician S Hoffman (T143) Date: 2-14-97

Quality Assurance Steve Jura (A 34) Date: 2-18-97

CSI: Mike Mendoza (QC 176) Date: 2-19-97

GSI: Maggie Stevens (C L 3387) Date: 2/14/97

Amplica, Inc. Newbury Park, CA 91320	SIZE	FSCM NO.		REV.
DRAWN	A	51025	ATP1773	
ISSUED	SCALE		SHEET 36 OF 38	

FORM 150

MODEL VD622301 S/N 108

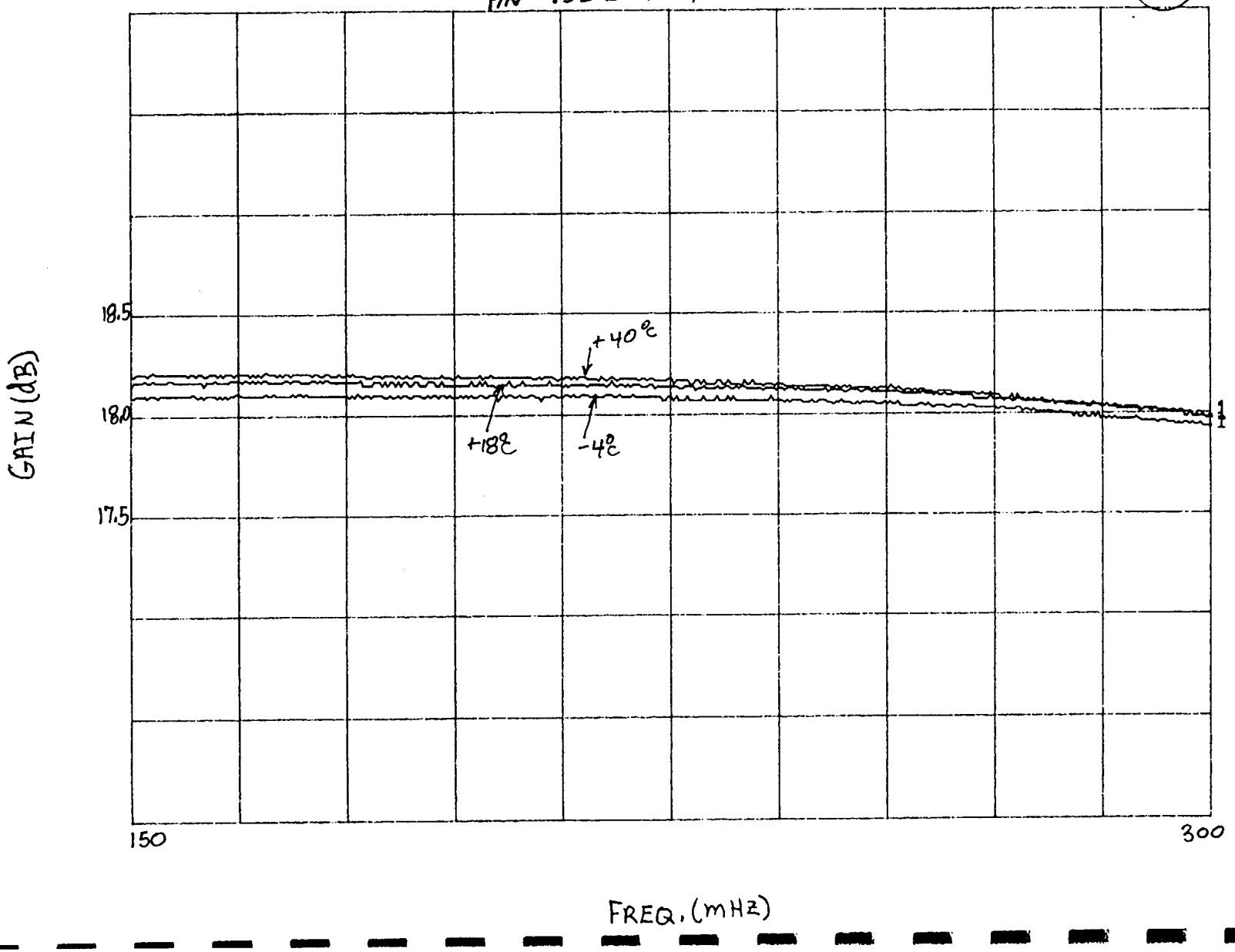
GAIN VS FREQUENCY

VERTICAL CALIBRATION .5 dB INCH

TEMPERATURE AS NOTED DEG.C.

TECH SH T143 DATE 2-13-97

P/N 1331579-9



MODEL VD622301 S/N 108

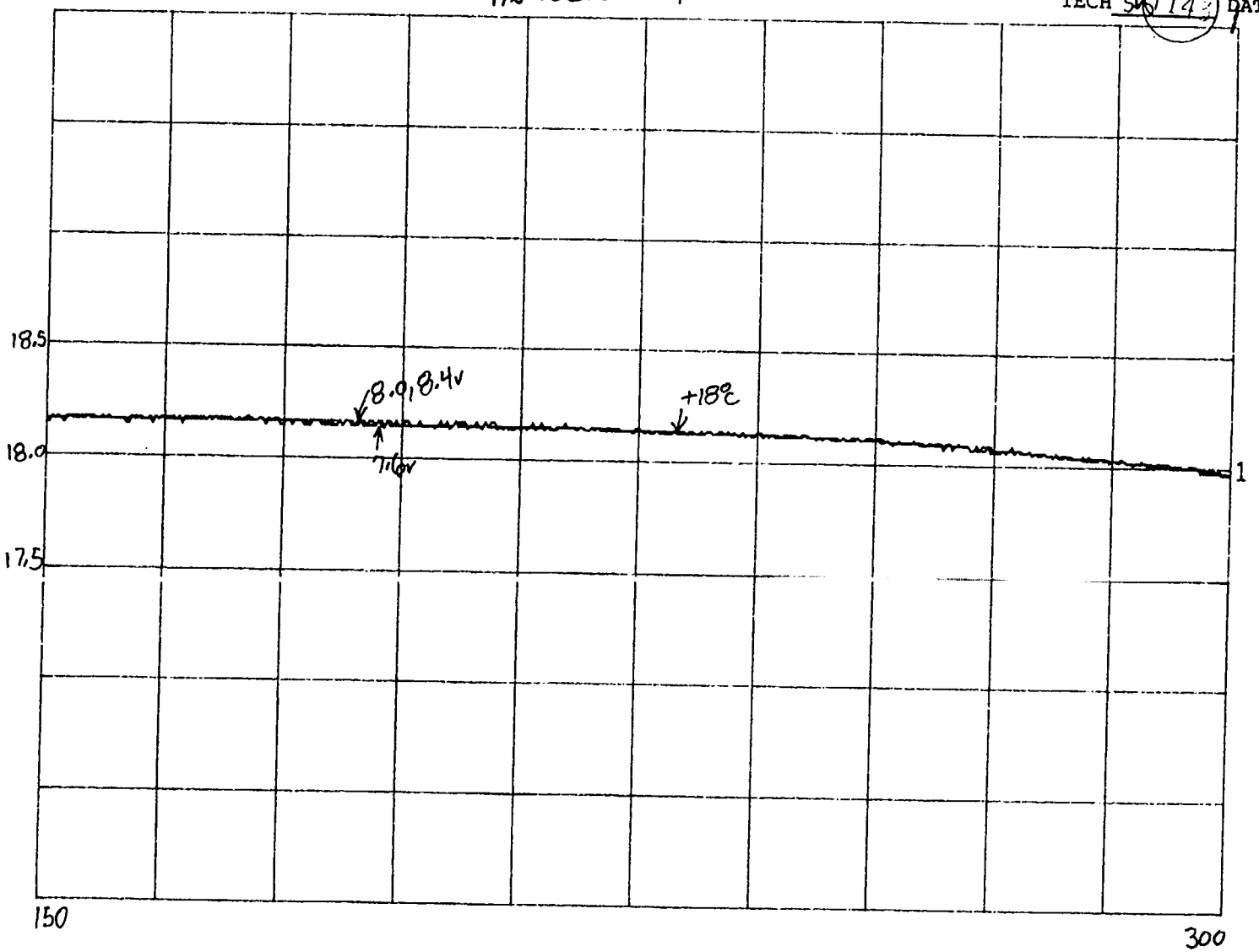
GAIN-VOLTAGE SENSITIVITY VS. FREQ.

VERTICAL CALIBRATION 0.5dB INCH

TEMPERATURE AS NOTED DEG.C.

TECH SH T14 DATE 2-13-97

P/N 1331579-9



MODEL VD622301 S/N 108

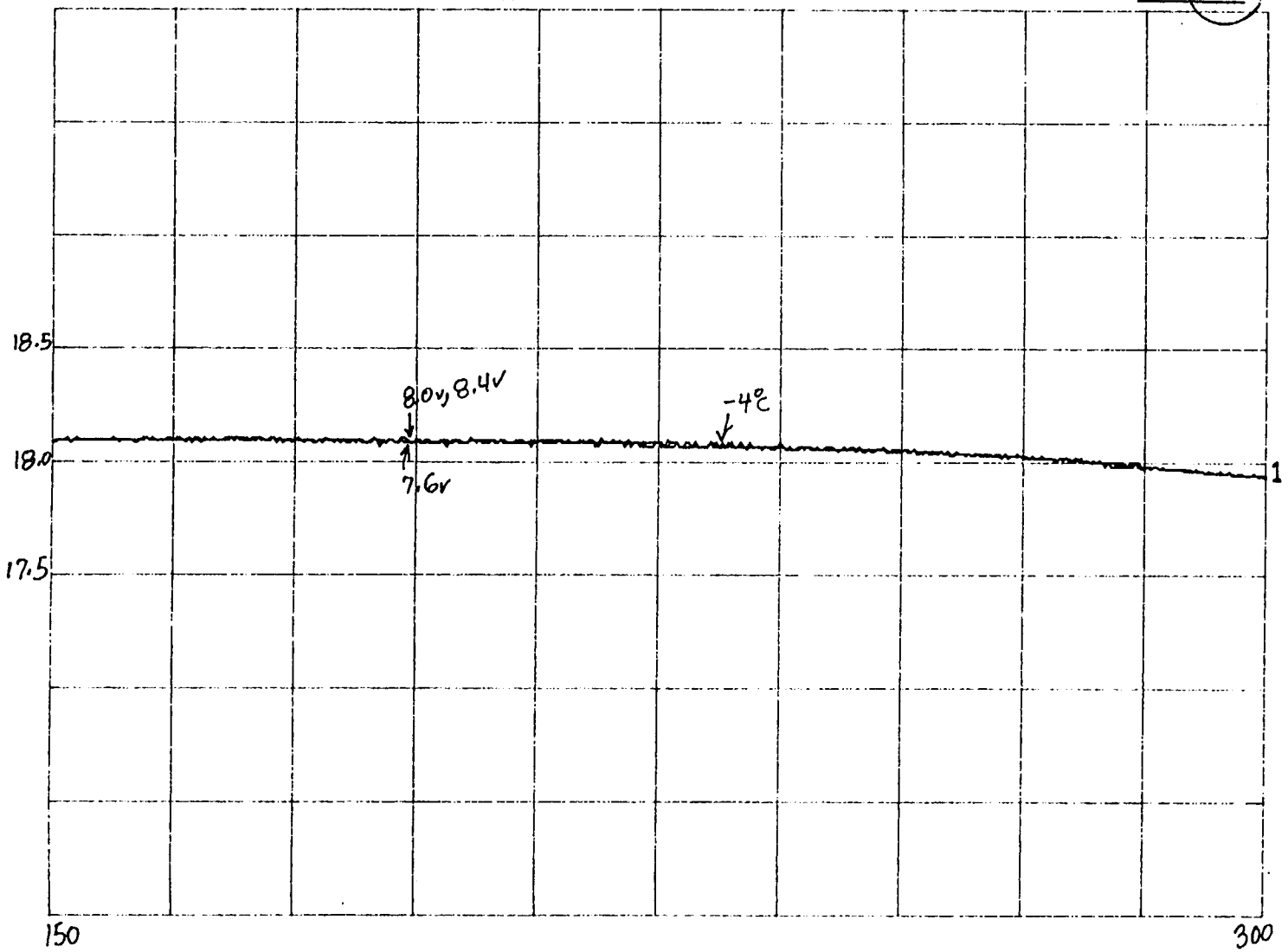
GAIN-VOLTAGE SENSITIVITY VS. FREQ.

VERTICAL CALIBRATION 0.5dB INCH

TEMPERATURE AS NOTED DEG.C.

TECH SM T14 DATE 2-13-97

P/N 1331579-9



MODEL VD622301 S/N 108

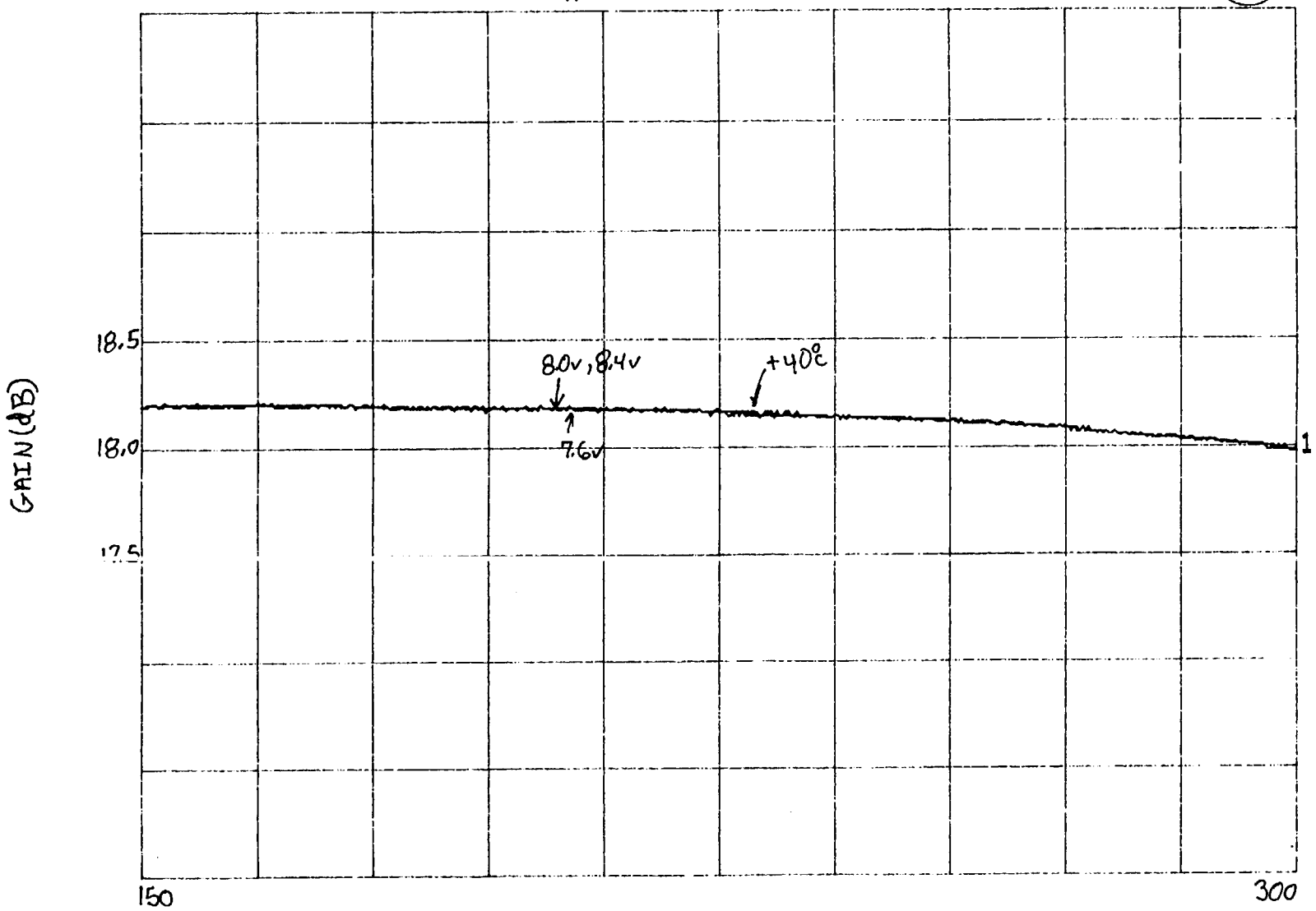
GAIN-VOLTAGE SENSITIVITY VS. FREQ.

VERTICAL CALIBRATION 0.5dB INCH

TEMPERATURE AS NOTED DEG.C.

TECH SM T143 DATE 2-13-97

P/N 1331579-9



Channels 11-14 Amplifier

IF Amplifier (P/N:1331579-7, S/N: 108)

APPENDIX C
ATP1771 DATA SHEET
MODEL NUMBER UD122301
AEROJET P/N 1331579-7

S/N 108

PARA	TEST	SPECIFICATION	+18°C	-4°C	+40°C	DATE
4.1.1	Examination of Product		Accept X Reject			2-13-97
4.2.2	* Current Limiting	200 mA maximum Reg. VOLTAGE= N/A VDC Total R= N/A ohm max. current draw =	N/A mA			
4.4	Electrical Test					N/A
4.4.1	* Polarity Reversal Protection	No Damage	Current N/A mA Accept N/A Reject			N/A
	Short Open Protection	No Damage	Accept X Reject			2-13-97
	Output Coupling	Output shall be AC coupled	Accept X Reject			2-13-97
4.4.2	Gain vs. Freq. 255 MHz to 390 MHz	14.5dB Min., 15.5dB Max. -4°C to +40°C Attach x-y plot	Max 15.00 dB Min 14.58 dB Accept X Reject	Max 14.97 dB Min 14.62 dB Accept X Reject	Max 15.01 dB Min 14.55 dB Accept X Reject	2-13-97
	Gain Flatness	.5 dB Maximum Worse Case	Accept X Reject 0.42 dB	Accept X Reject 0.35 dB	Accept X Reject 0.46 dB	2-13-97
	Gain Temp. Sensitivity	±.22 dB from -4°C to +40°C Worse Case	Accept X Reject	Accept X Reject 0.04 dB	Accept X Reject 0.03 dB	2-13-97
4.4.3	Gain-Voltage Sensitivity	≤.5dB/v Worse Case	0.01 dB	0.01 dB	0.01 dB	
	Input Currents	± .2dB for 7.6 to 8.4 Vdc 40ma MAX. 7.6v 8.0v 8.4v	33.6 mA 34.4 mA 34.9 mA	30.1 mA 31.0 mA 31.4 mA	36.6 mA 37.4 mA 38.0 mA	
		Attach X-Y Plot	Accept X Reject	Accept X Reject	Accept X Reject	2-13-97

NOTE: * TEST REQUIRED ON PROTOFLIGHT UNIT ONLY

APPENDIX C
ATP1771 DATA SHEET
MODEL NUMBER UD122301
AEROJET P/N 1331579-7

S/N 108

PARA	TEST	SPECIFICATION	+18°C	-4°C	+40°C	DATE
4.4.7	Compression	1 dB maximum Compression AT +10 dBm Output Power	Accept X Reject ___			
		255 MHz	0.20 dB	0.35 dB	0.20 dB	
		322.5 MHz	0.20 dB	0.25 dB	0.25 dB	
		390 MHz	0.15 dB	0.25 dB	0.20 dB	2-13-97
4.4.8	Stability	Stable with the input terminated into a 2.5:1 mismatch and the output at all impedance's.	Accept X Reject ___			2-13-97
4.4.9	Start-up	Capable of starting operation at -30°C and +60°C with a maximum current draw of 45 mA	Accept X Reject ___			
		Maximum Current	38.7 mA			2-14-97

NOTE: Review all recorded data and signify acceptance below.

Technician T143 Date: 2-14-97

Quality Assurance Date: 2-18-97

CSI: Date: 2-19-97

GSI: Date: 2/14/97

Amplica, Inc. Newbury Park, CA 91320	SIZE A	FSCM NO. 51025	ATP1771	REV.
DRAWN				
ISSUED	SCALE		SHEET 37 OF 39	

MODEL UD122301 S/N 108

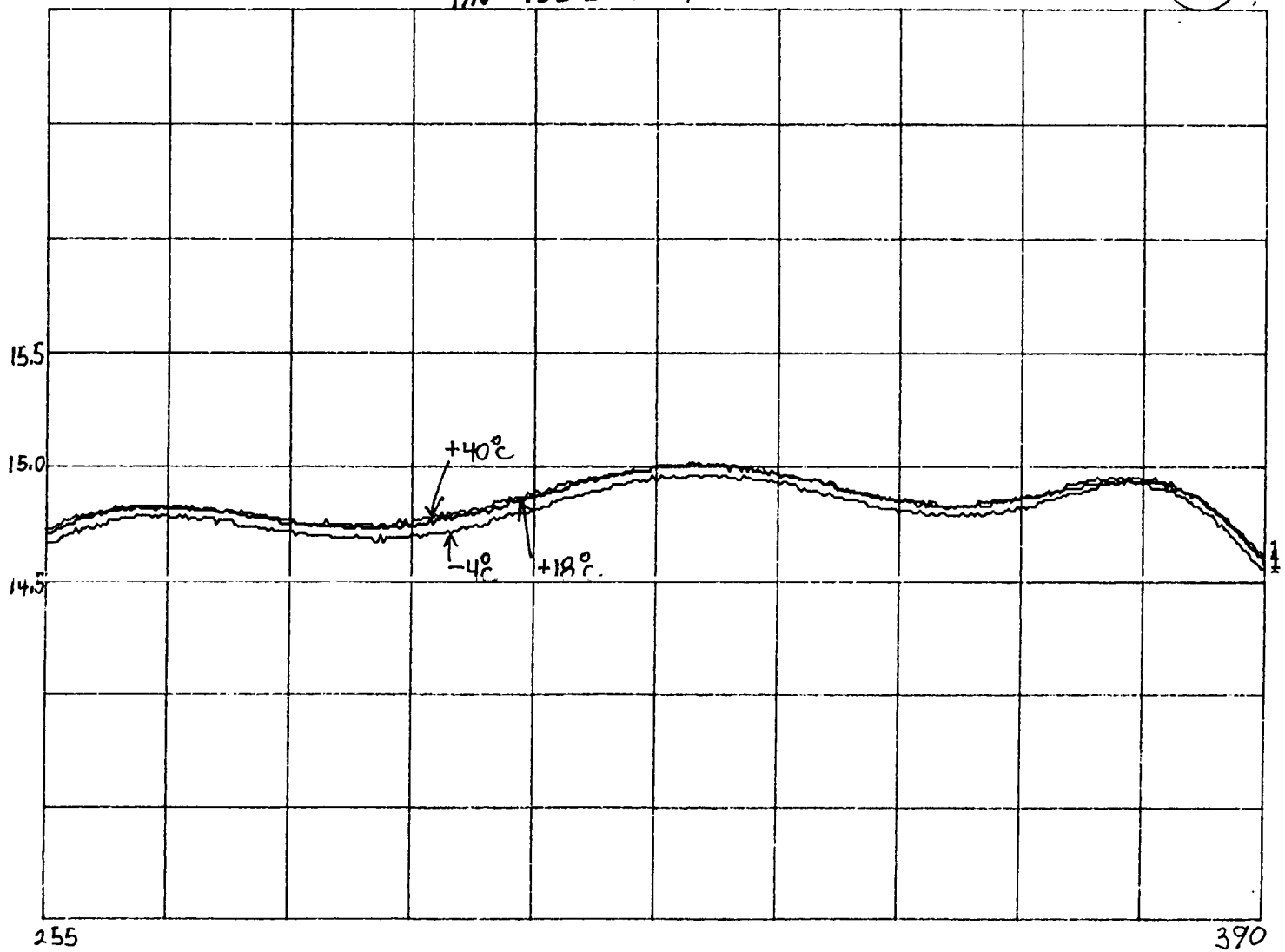
GAIN VS FREQUENCY

VERTICAL CALIBRATION .5 dB INCH

TEMPERATURE AS NOTED DEG.C.

TECH SAT143 DATE 2-13-97

P/N 1331579-7



MODEL UD122301 S/N 108

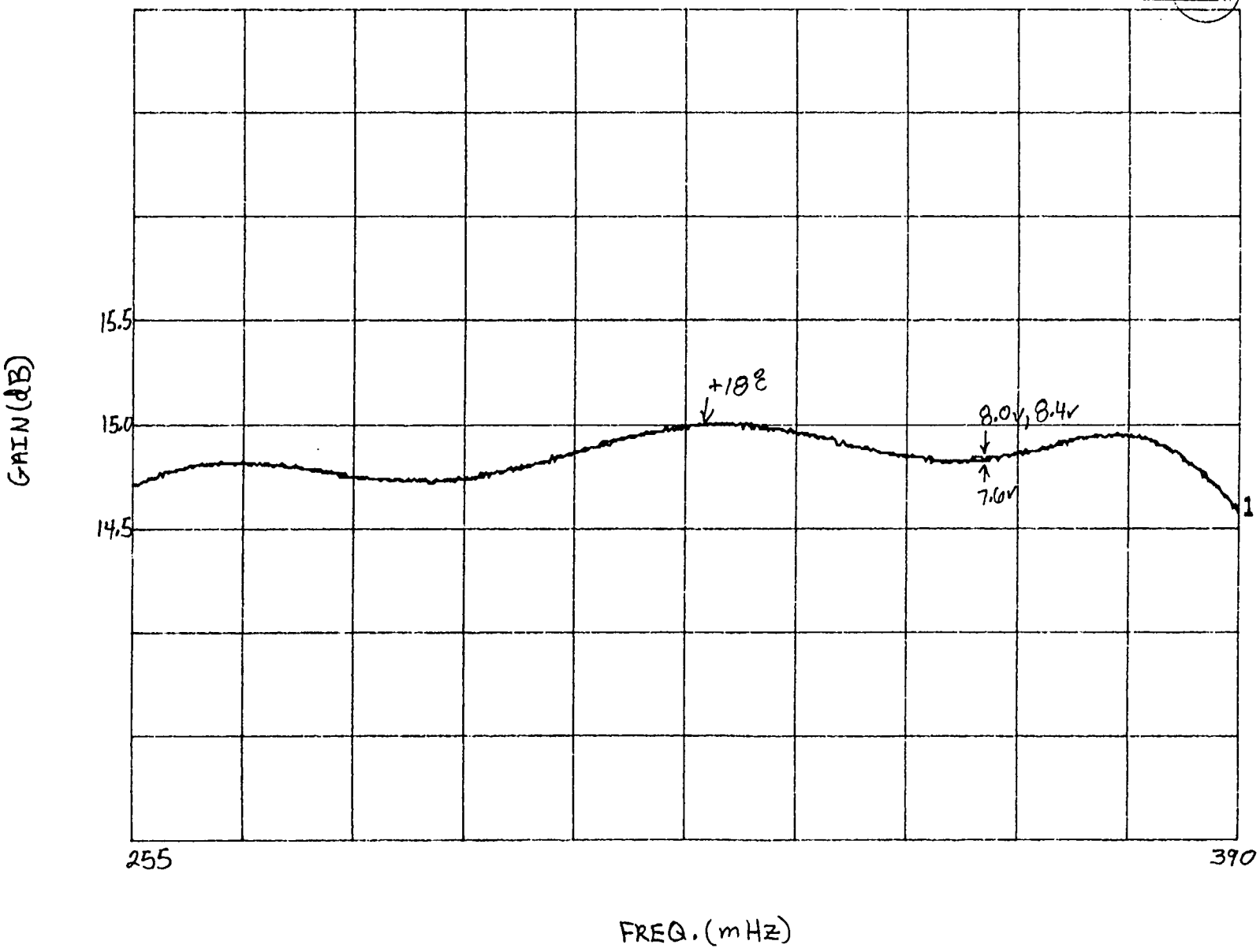
GAIN-VOLTAGE SENSITIVITY VS. FREQ.

VERTICAL CALIBRATION 0.5dB INCH

TEMPERATURE AS NOTED DEG.C.

TECH SM/TH DATE 2-13-97

P/N 1331579-7



MODEL UD12230I S/N 108

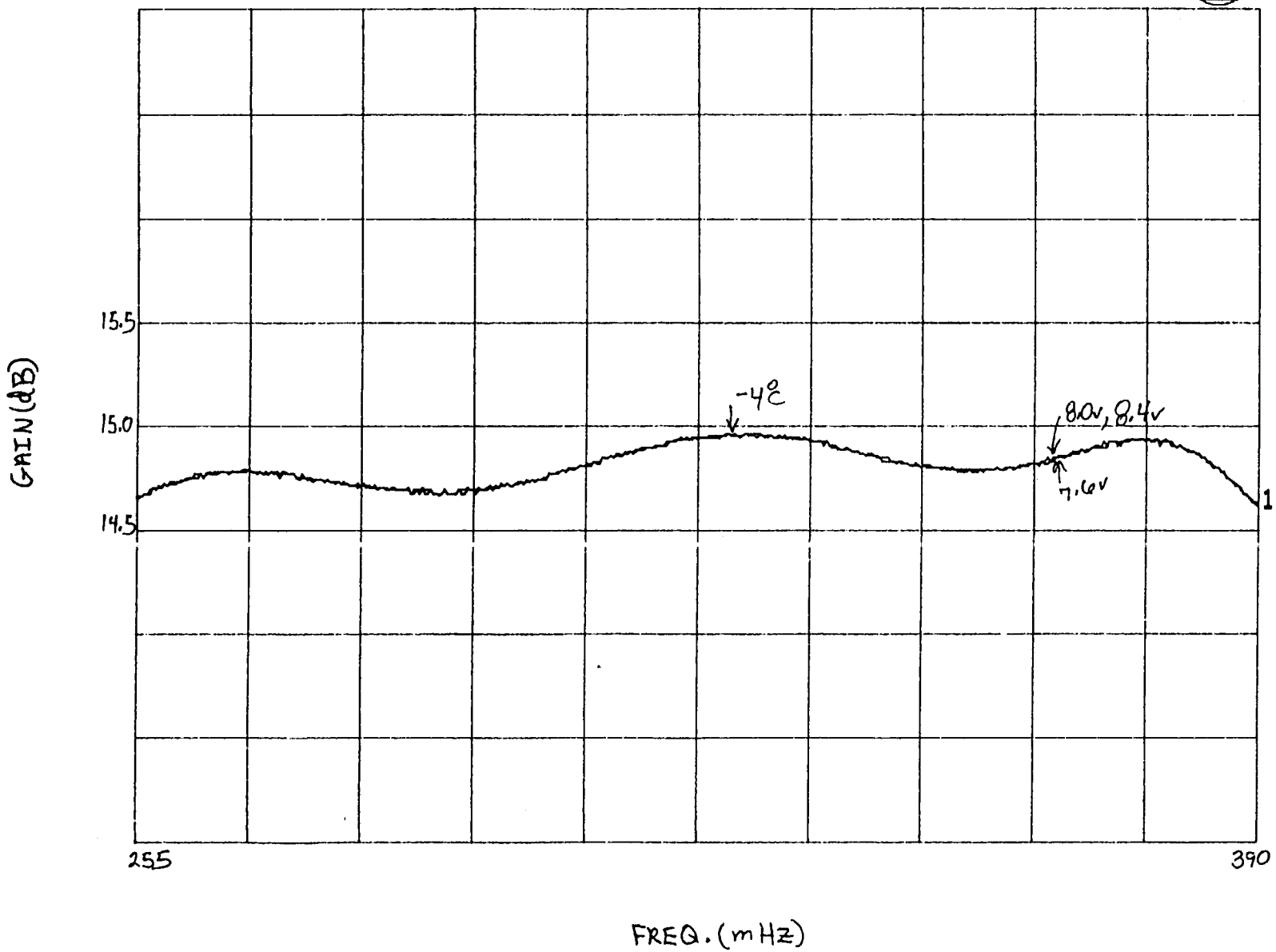
GAIN-VOLTAGE SENSITIVITY VS. FREQ.

VERTICAL CALIBRATION 0.5dB INCH

TEMPERATURE AS NOTED DEG.C.

TECH SW (T143) DATE 2-13-97

P/N 1331579-7



MODEL UD122301 S/N 108

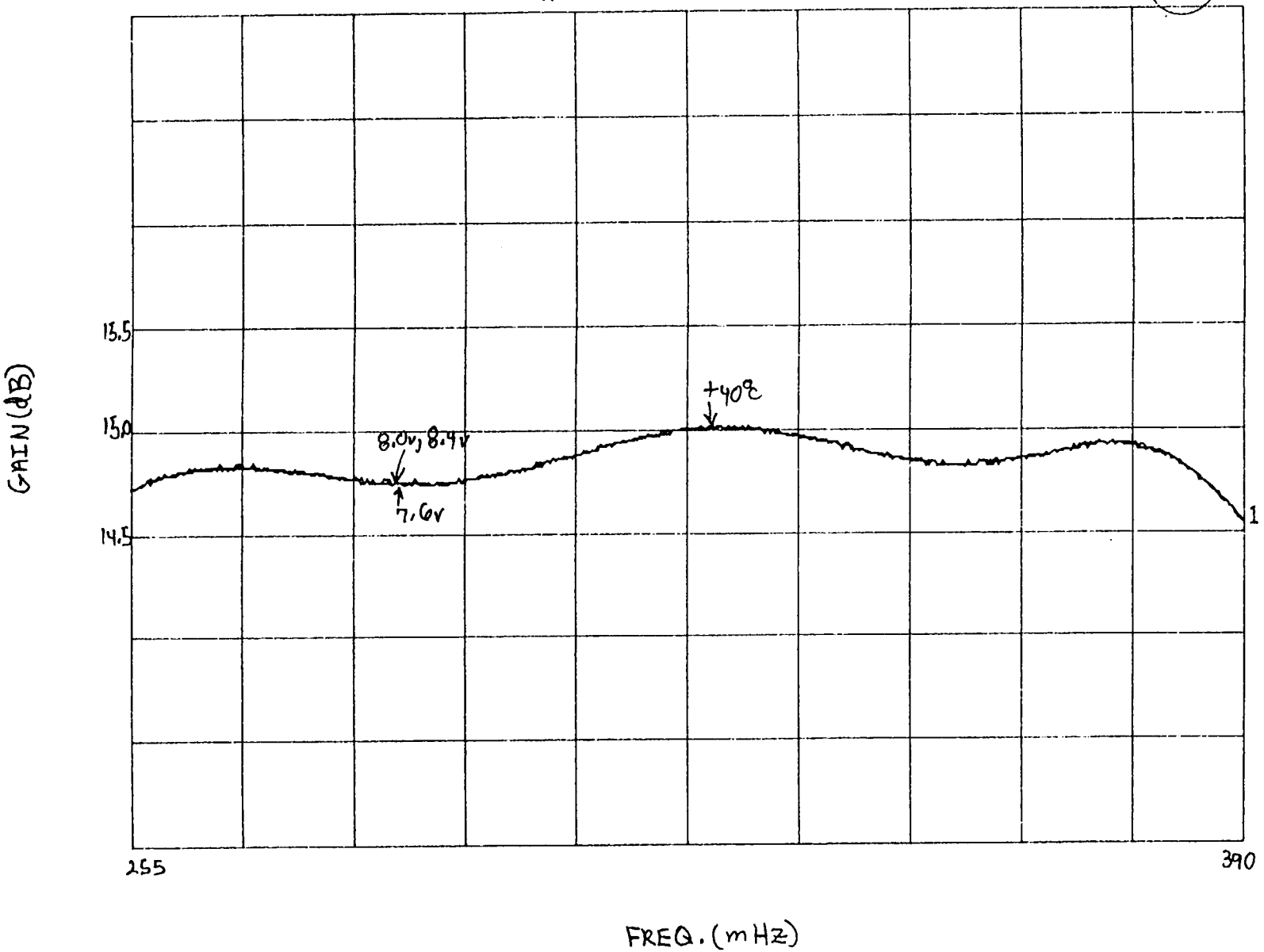
GAIN-VOLTAGE SENSITIVITY VS. FREQ.

VERTICAL CALIBRATION 0.5dB INCH

TEMPERATURE AS NOTED DEG.C.

TECH T143 DATE 2-13-97

P/N 1331579-7



Channel 11 Amplifier

IF Amplifier (P/N:1331579-10, S/N: 107)

APPENDIX C
ATP1774 DATA SHEET
MODEL NUMBER UD114302
AEROJET P/N 1331579-10

S/N 107

PARA	TEST	SPECIFICATION	+18°C	-4°C	+40°C	DATE
4.1.1	Examination of Product		Accept X Reject			2-8-97
4.2.2	* Current Limiting	200 mA maximum Reg. VOLTAGE= N/A VDC Total R= N/A ohm max. current draw =	N/A mA			2-8-97
4.4	Electrical Test					
4.4.1	* Polarity Reversal Protection	No Damage	Current N/A mA Accept N/A Reject			N/A
	Short Open Protection	No Damage	Accept X Reject			2-8-97
	Output Coupling	Output shall be AC coupled	Accept X Reject			2-8-97
4.4.2	Gain vs. Freq. 255 MHz to 390 MHz	38.5dB Min., 39.5dB Max. -4°C to +40°C Attach x-y plot	Max 39.22 dB Min 38.85 dB Accept X Reject	Max 39.39 dB Min 39.09 dB Accept X Reject	Max 39.00 dB Min 38.55 dB Accept X Reject	2-8-97
	Gain Flatness	.5 dB Maximum Worse Case	Accept X Reject 0.37 dB	Accept X Reject 0.30 dB	Accept X Reject 0.45 dB	2-8-97
	Gain Temp. Sensitivity	±.44 dB from -4°C to +40°C Worse Case	Accept X Reject	Accept X Reject 0.30 dB	Accept X Reject 0.34 dB	2-8-97
4.4.3	Gain-Voltage Sensitivity Input Currents	≤.5dB/v Worse Case ± .2dB for 7.6v 7.6 to 8.4 Vdc 8.0v 45ma MAX. 8.4v Attach X-Y Plot	0.02 dB 38.6 mA 39.3 mA 39.9 mA Accept X Reject	0.03 dB 37.4 mA 38.1 mA 38.7 mA Accept X Reject	0.02 dB 39.8 mA 40.5 mA 41.1 mA Accept X Reject	2-8-97

NOTE: * TEST REQUIRED ON PROTOFLIGHT UNIT ONLY

APPENDIX C
ATP1774 DATA SHEET
MODEL NUMBER UD114302
AEROJET P/N 1331579-10

S/N 107

PARA	TEST	SPECIFICATION	+18°C	-4°C	+40°C	DATE
4.4.7	Compression	1 dB maximum Compression AT +10 dBm Output Power	Accept X Reject ___			
		255 MHz	0.50 dB	0.70 dB	0.45 dB	
		322.5 MHz	0.45 dB	0.65 dB	0.45 dB	
		390 MHz	0.65 dB	0.80 dB	0.60 dB	2-8-97
4.4.8	Stability	Unconditionally Stable	Accept X Reject ___			2-8-97
4.4.9	Start-up	Capable of starting operation at -30°C and +60°C with a maximum current draw of 50 mA	Accept X Reject ___			
		Maximum Current	41.2 mA			2-10-97

NOTE: Review all recorded data and signify acceptance below.

Technician Stephanie 1143 Date: 2-10-97

Quality Assurance Irene Pina A 34 QC 176 Date: 2-18-97

CSI: Miles Trent Date: 2-19-97

GSI: Marjorie Thomas Date: 2-10-97

MODEL UD114302 S/N 107

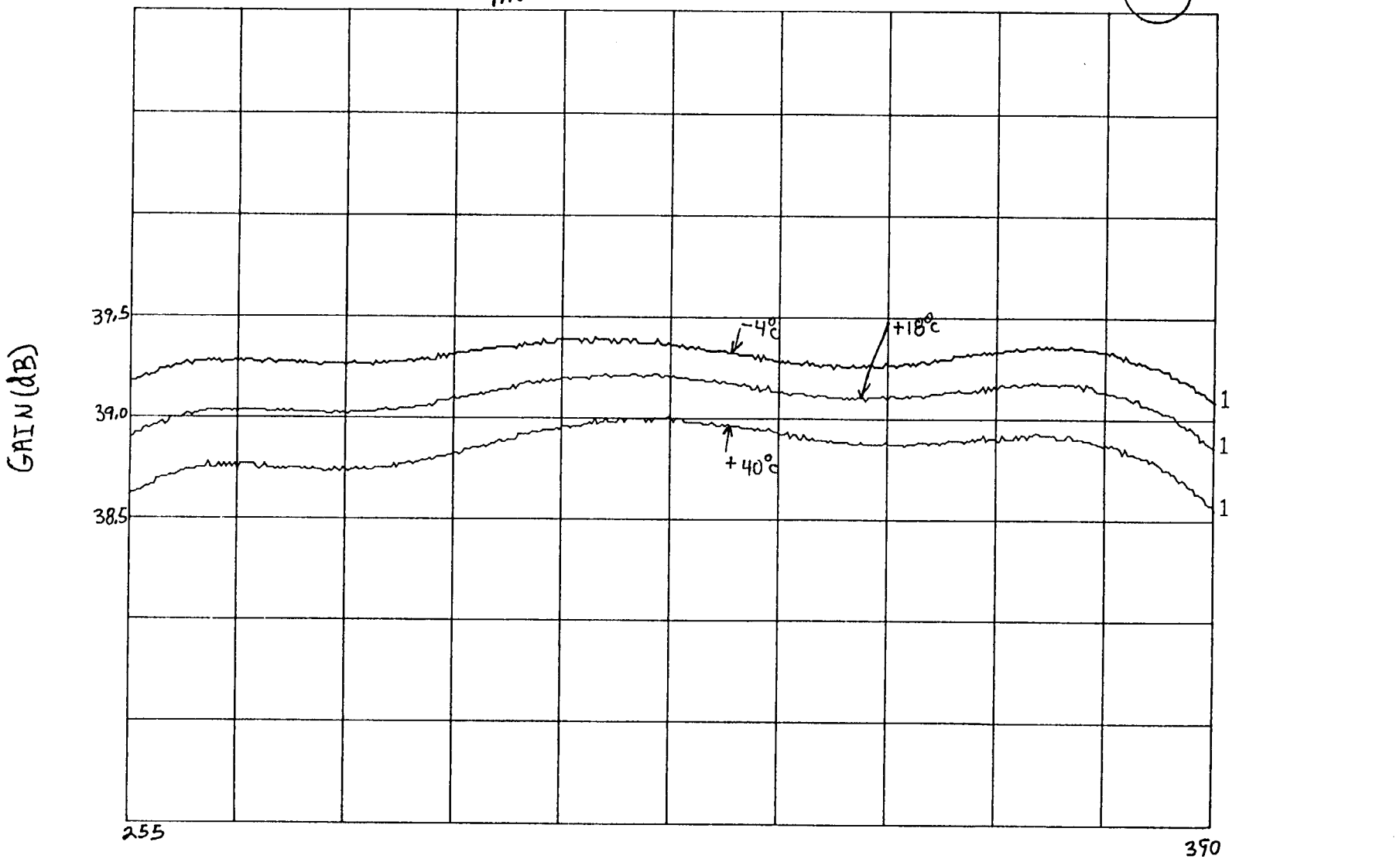
GAIN VS FREQUENCY

VERTICAL CALIBRATION .5 dB INCH

TEMPERATURE AS NOTED DEG.C.

TECH SWS DATE 2-8-97

P/N 1331579-10



MODEL UD114302 S/N 107

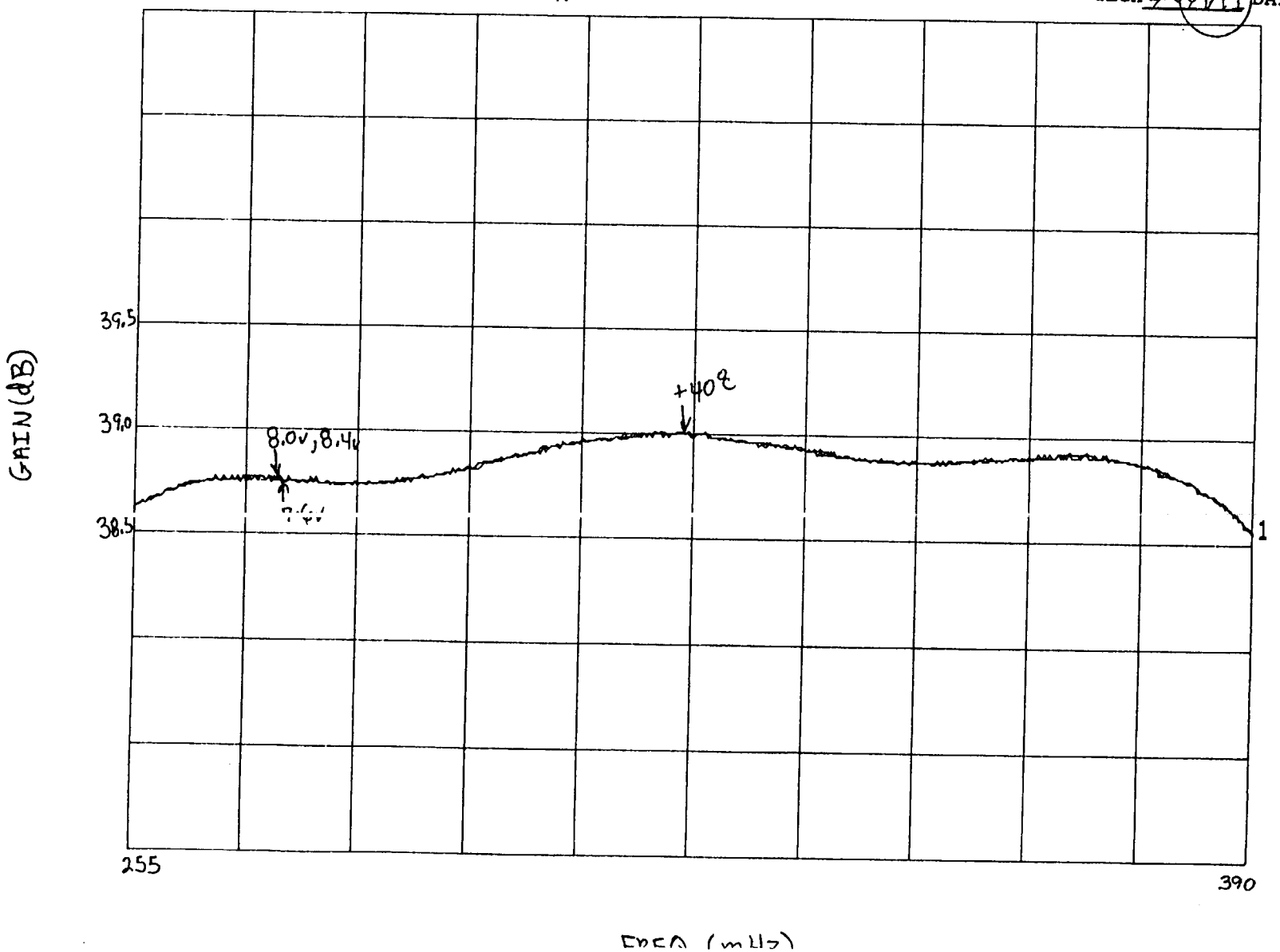
GAIN-VOLTAGE SENSITIVITY VS. FREQ.

VERTICAL CALIBRATION 0.5dB INCH

TEMPERATURE AS NOTED DEG.C.

TECH [illegible] DATE 2-8-97

P/N 1331579-10



MODEL UD114302 S/N 107

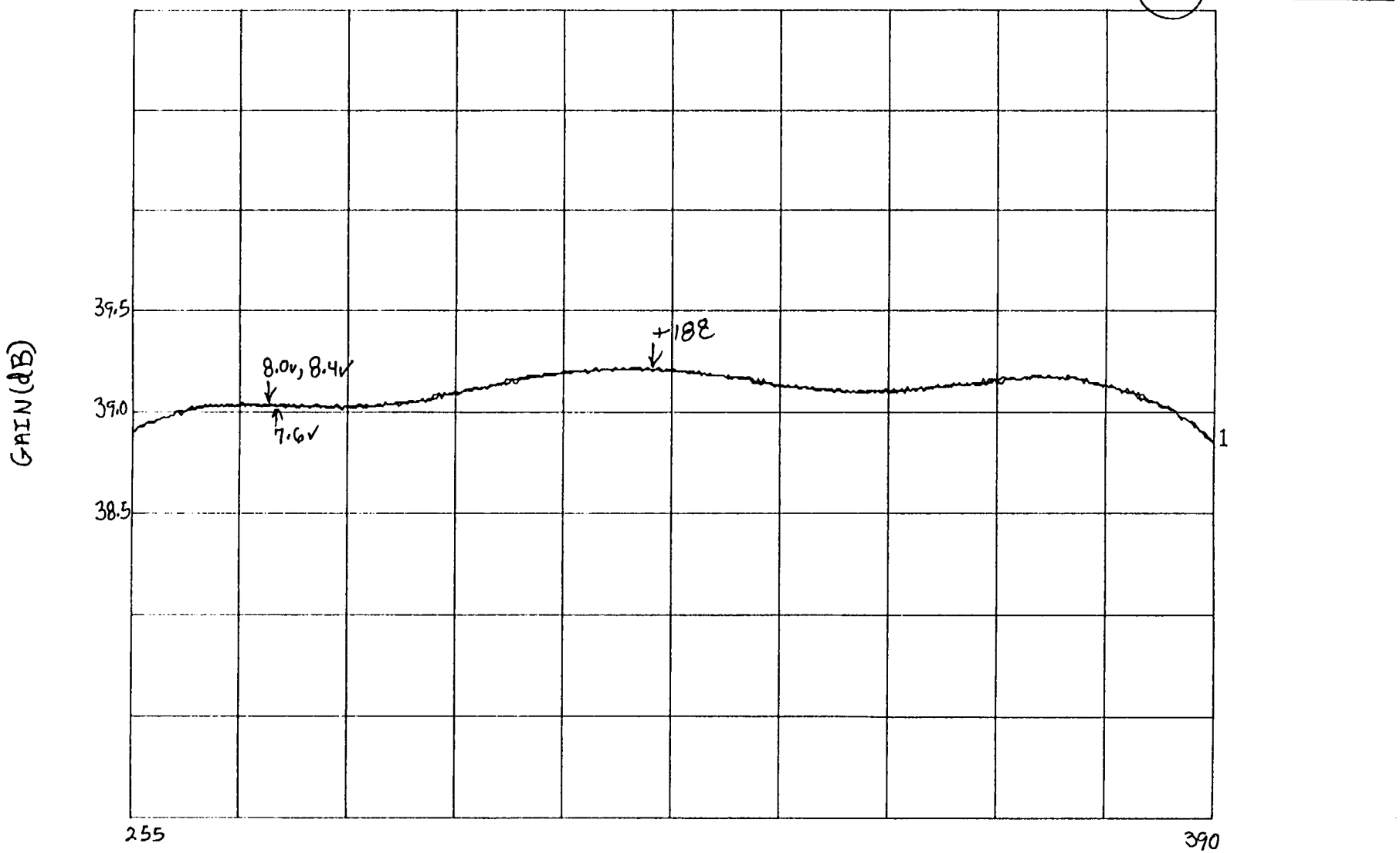
GAIN-VOLTAGE SENSITIVITY VS. FREQ.

VERTICAL CALIBRATION 0.5dB INCH

TEMPERATURE AS NOTED DEG.C.

TECH [illegible] DATE 2-8-97

P/N 1331579-10



MODEL UD 114302 S/N 107

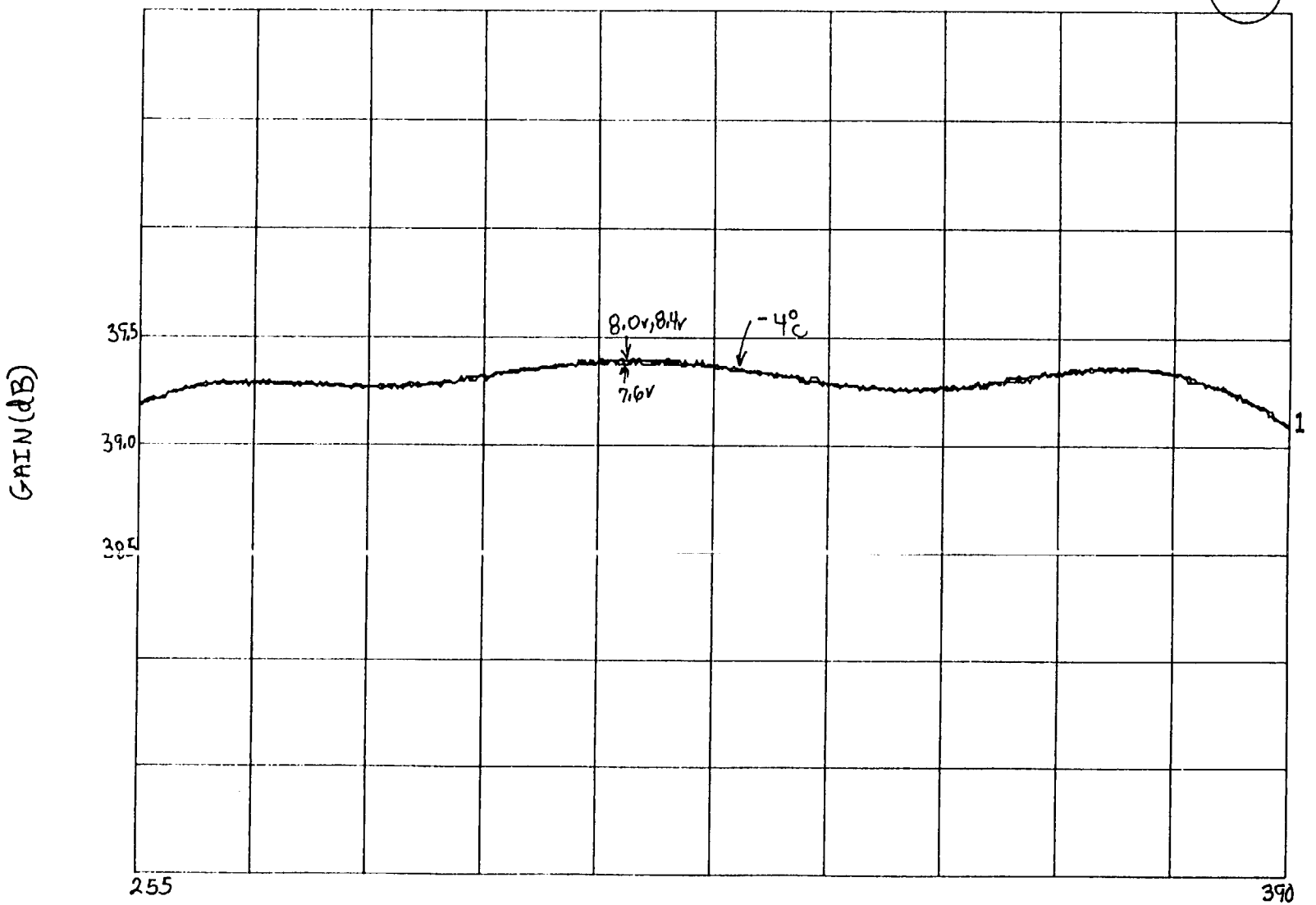
GAIN-VOLTAGE SENSITIVITY VS. FREQ.

VERTICAL CALIBRATION 0.5dB INCH

TEMPERATURE AS NOTED DEG.C.

TECH SVT 11 DATE 2-8-97

P/N 1331579-10



Channel 12 Amplifier

IF Amplifier (P/N:1331579-11, S/N: 108)

APPENDIX C
ATP1775 DATA SHEET
MODEL NUMBER UD415301
AEROJET P/N 1331579-11

S/N 108

PARA	TEST	SPECIFICATION	+18°C	-4°C	+40°C	DATE
4.1.1	Examination of Product		Accept X Reject			2-13-97
4.2.2	* Current Limiting	200 mA maximum Reg. VOLTAGE= N/A VDC Total R= N/A ohm max. current draw =	N/A mA			N/A
4.4	Electrical Test					
4.4.1	* Polarity Reversal Protection	No Damage	Current N/A mA Accept N/A Reject			N/A
	Short Open Protection	No Damage	Accept X Reject			2-13-97
	Output Coupling	Output shall be AC coupled	Accept X Reject			2-13-97
4.4.2	Gain vs. Freq. 290 MHz to 355 MHz	42.5dB Min., 43.5dB Max. -4°C to +40°C Attach x-y plot	Max 43.15 dB Min 43.01 dB Accept X Reject	Max 43.30 dB Min 43.15 dB Accept X Reject	Max 42.87 dB Min 42.74 dB Accept X Reject	2-13-97
	Gain Flatness	.5 dB Maximum Worse Case	Accept X Reject 0.14 dB	Accept X Reject 0.15 dB	Accept X Reject 0.13 dB	2-13-97
	Gain Temp. Sensitivity	±.44 dB from -4°C to +40°C Worse Case	Accept X Reject	Accept X Reject 0.15 dB	Accept X Reject 0.28 dB	2-13-97
4.4.3	Gain-Voltage Sensitivity	≤.5dB/v Worse Case	0.03 dB	0.02 dB	0.02 dB	
	Input Currents	± .2dB for 7.6 to 8.4 Vdc 50ma MAX. Attach X-Y Plot	7.6v 30.7 mA 8.0v 39.4 mA 8.4v 40.0 mA Accept X Reject	37.3 mA 38.0 mA 38.5 mA Accept X Reject	40.0 mA 40.6 mA 41.2 mA Accept X Reject	2-13-97

NOTE: * TEST REQUIRED ON PROTOFLIGHT UNIT ONLY

APPENDIX C
ATP1775 DATA SHEET
MODEL NUMBER UD415301
AEROJET P/N 1331579-11

S/N 108

PARA	TEST	SPECIFICATION	+18°C	-4°C	+40°C	DATE
4.4.7	Compression	1 dB maximum Compression AT +10 dBm Output Power	Accept ✓ Reject ____			
		290 MHz	0.45 dB	0.55 dB	0.40 dB	
		322.5 MHz	0.45 dB	0.55 dB	0.40 dB	
		355 MHz	0.50 dB	0.60 dB	0.50 dB	2-14-97
4.4.8	Stability	Unconditionally Stable	Accept ✓ Reject ____			2-14-97
4.4.9	Start-up	Capable of starting operation at -30°C and +60°C with a maximum current draw of 55 mA	Accept X Reject ____			
		Maximum Current	41.3 mA			2-14-97

NOTE: Review all recorded data and signify acceptance below.

Technician [signature] T143 A 34 Date: 2-14-97

Quality Assurance [signature] Date: 2-18-97

CSI: [signature] QC 176 Date: 2-19-97

GSI: _____ Date: 2-14-97

Amplica, Inc. Newbury Park, CA 91320	SIZE A	FSCM NO. 51025	ATP1775	REV.
DRAWN				
ISSUED	SCALE		SHEET 37 OF 39	

MODEL UD415301 S/N 108

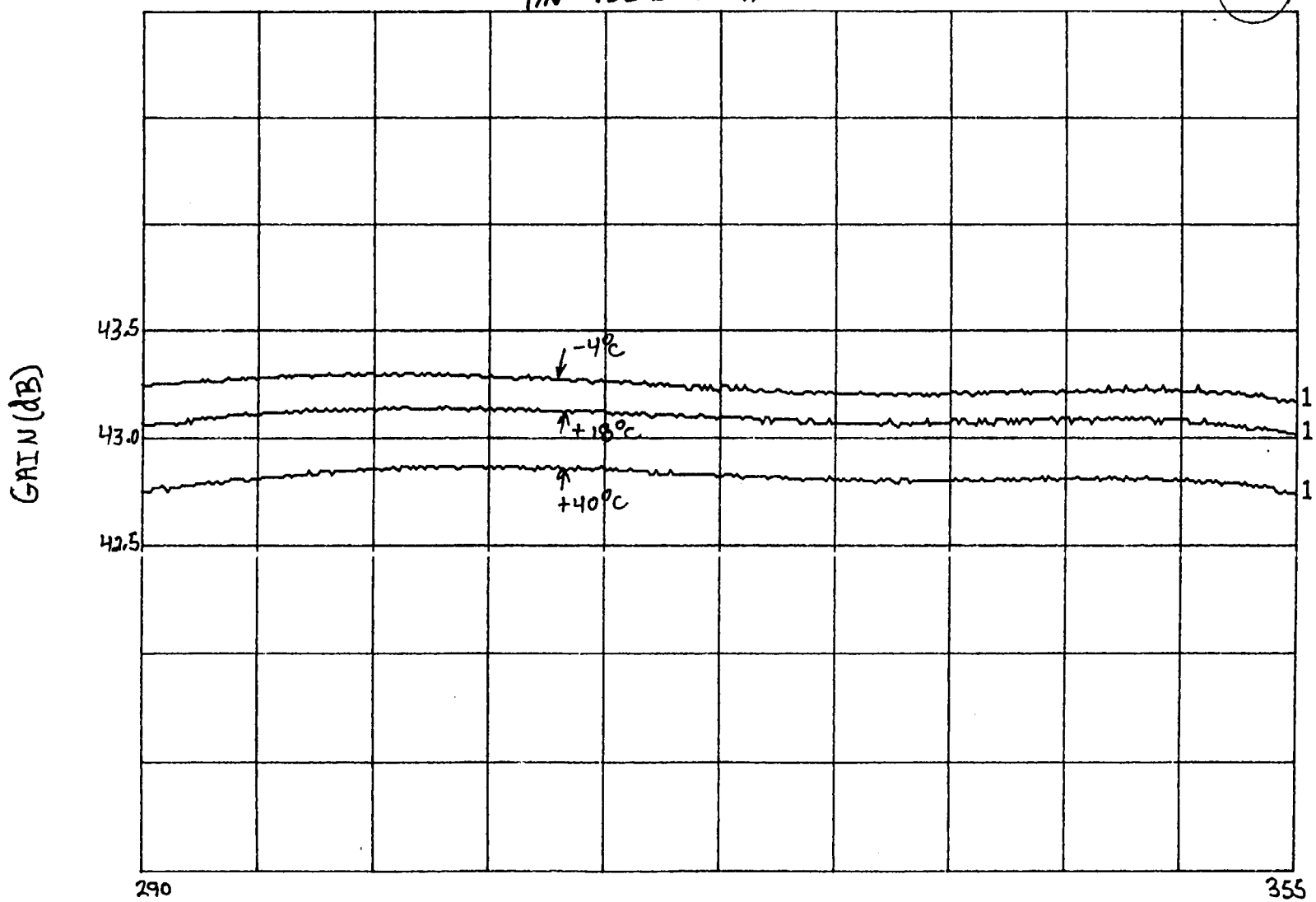
GAIN VS FREQUENCY

VERTICAL CALIBRATION .5 dB INCH

TEMPERATURE AS NOTED DEG.C.

TECH SW T143 DATE 2-13-97

P/N 1331579-11



MODEL UD415301 S/N 108

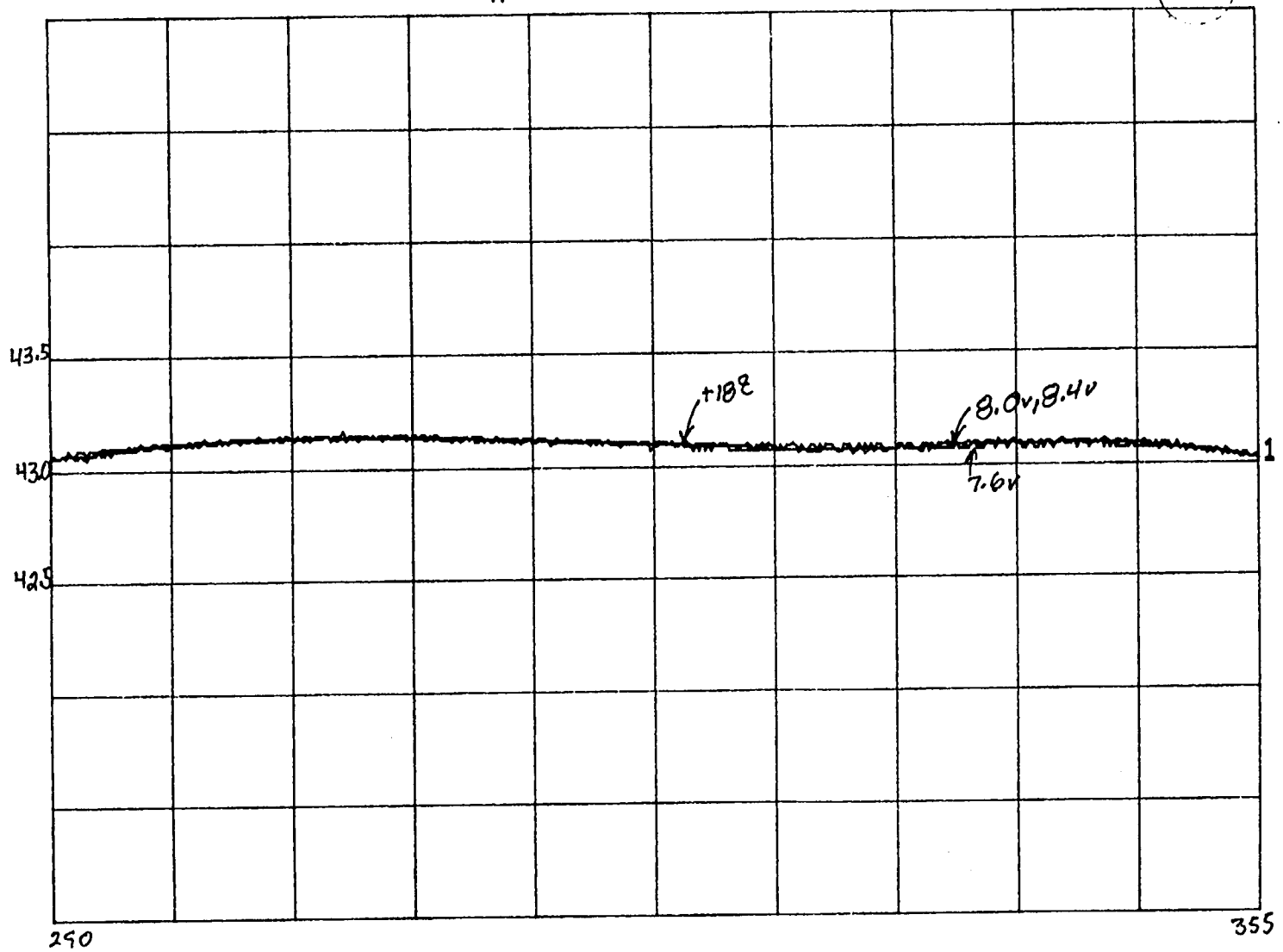
GAIN-VOLTAGE SENSITIVITY VS. FREQ.

VERTICAL CALIBRATION 0.5dB INCH

TEMPERATURE AS NOTED DEG.C.

TECH SHT 142 DATE 2-13-97

P/N 1331579-11



MODEL UD415301 S/N 108

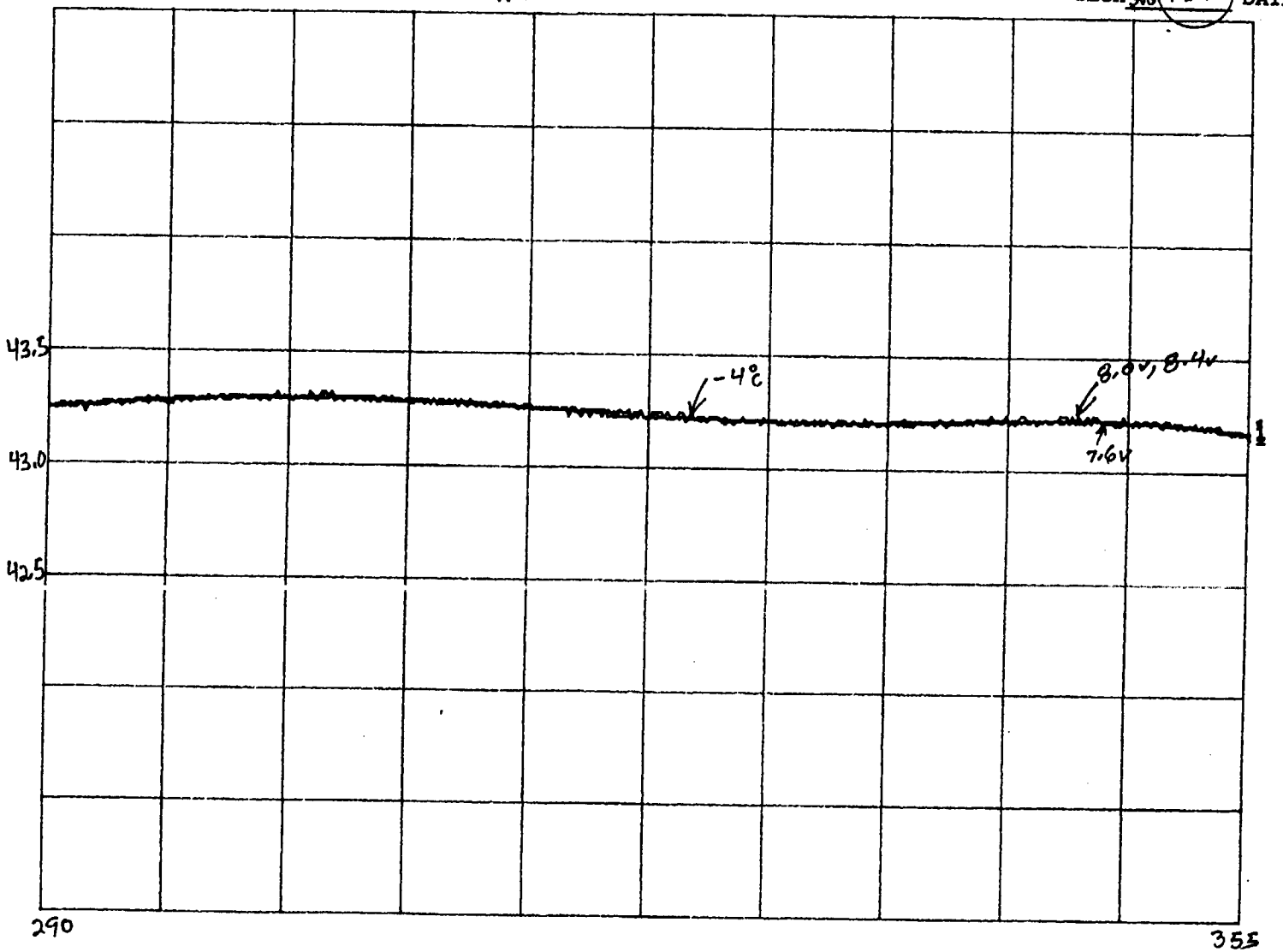
GAIN-VOLTAGE SENSITIVITY VS. FREQ.

VERTICAL CALIBRATION 0.5dB INCH

TEMPERATURE AS NOTED DEG.C.

TECH SW T143 DATE 2-13-97

P/N 1331579-11



MODEL UD415301 S/N 108

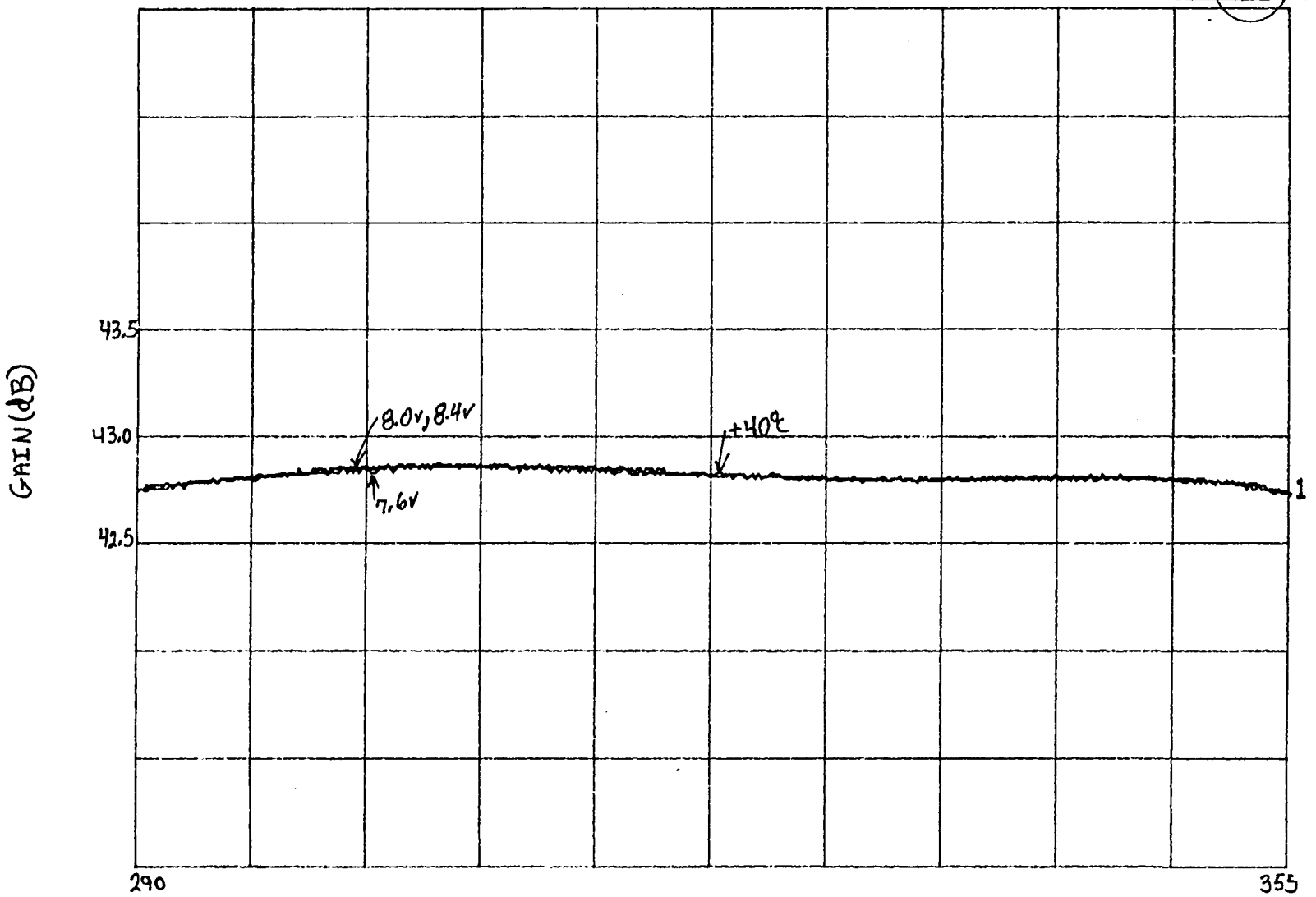
GAIN-VOLTAGE SENSITIVITY VS. FREQ.

VERTICAL CALIBRATION 0.5dB INCH

TEMPERATURE AS NOTED DEG.C.

TECH SH T143 DATE 2-13-97

P/N 1331579-11



Channel 13 Amplifier

IF Amplifier (P/N:1331579-12, S/N: 108)

APPENDIX C
ATP1776 DATA SHEET
MODEL NUMBER UD315301
AEROJET P/N 1331579-12

S/N 108

PARA	TEST	SPECIFICATION	+18°C	-4°C	+40°C	DATE
4.1.1	Examination of Product		Accept X Reject			2-14-97
4.2.2	* Current Limiting	200 mA maximum Reg. VOLTAGE= N/A VDC Total R= N/A ohm max. current draw =	N/A mA			N/A
4.4	Electrical Test					
4.4.1	* Polarity Reversal Protection	No Damage	Current N/A mA Accept N/A Reject			N/A
	Short Open Protection	No Damage	Accept X Reject			2-14-97
	Output Coupling	Output shall be AC coupled	Accept X Reject			2-14-97
4.4.2	Gain vs. Freq. 305 MHz to 340 MHz	44.5dB Min., 45.5dB Max. -4°C to +40°C Attach x-y plot	Max 45.27dB Min 44.95 dB Accept X Reject	Max 45.34 dB Min 45.02 dB Accept X Reject	Max 45.08 dB Min 44.71 dB Accept X Reject	2-14-97
	Gain Flatness	.5 dB Maximum Worse Case	Accept X Reject 0.32 dB	Accept X Reject 0.32 dB	Accept X Reject 0.37 dB	2-14-97
	Gain Temp. Sensitivity	±.44 dB from -4°C to +40°C Worse Case	Accept X Reject	Accept X Reject 0.09 dB	Accept X Reject 0.25 dB	2-14-97
4.4.3	Gain-Voltage Sensitivity	≤.5dB/v Worse Case ± .2dB for 7.6 to 8.4 Vdc 50ma MAX.	0.01, ~~.00~~ .54 dB 7.6v 40.0 mA 8.0v 40.7 mA 8.4v 41.3 mA	0.02 dB 38.7 mA 39.5 mA 40.0 mA	0.02 dB 41.1 mA 41.8 mA 42.4 mA	
	Input Currents	Attach X-Y Plot	Accept X Reject	Accept X Reject	Accept X Reject	2-14-97

NOTE: * TEST REQUIRED ON PROTOFLIGHT UNIT ONLY

APPENDIX C
ATP1776 DATA SHEET
MODEL NUMBER UD315301
AEROJET P/N 1331579-12

S/N 108

PARA	TEST	SPECIFICATION	+18°C	-4°C	+40°C	DATE
4.4.7	Compression	1 dB maximum Compression AT +10 dBm Output Power	Accept X Reject ___			
		305 MHz	0.40 dB	0.50 dB	0.40 dB	
		322.5 MHz	0.40 dB	0.50 dB	0.40 dB	
		340 MHz	0.50 dB	0.55 dB	0.50 dB	2-14-97
4.4.8	Stability	Unconditionally Stable	Accept X Reject ___			2-14-97
4.4.9	Start-up	Capable of starting operation at -30°C and +60°C with a maximum current draw of 55 mA	Accept X Reject ___			
		Maximum Current	423 mA			2-14-97

NOTE: Review all recorded data and signify acceptance below.

Technician Stephen T143 Date: 2-14-97

Quality Assurance Irene Luna A 34 QC 176 Date: 2-18-97

CSI: Mike Gruber Date: 2-19-97

GSI: Marjorie Thomas Date: 2/14/97

MODEL UD 315301 S/N 108

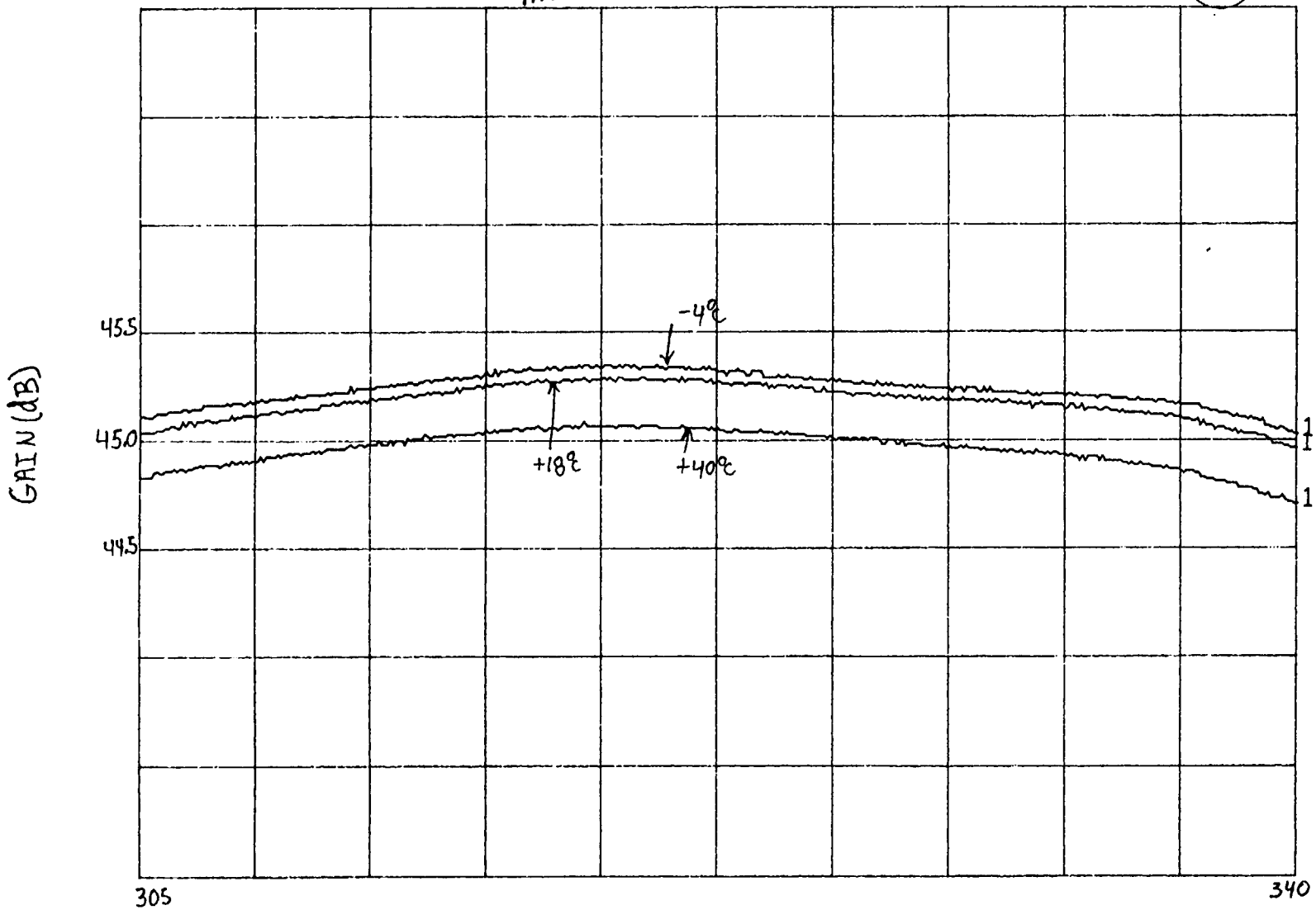
GAIN VS FREQUENCY

VERTICAL CALIBRATION .5 dB INCH

TEMPERATURE AS NOTED DEG.C.

TECH SJT143 DATE 2-14-97

P/N 1331579-12



MODEL UD315301 S/N 108

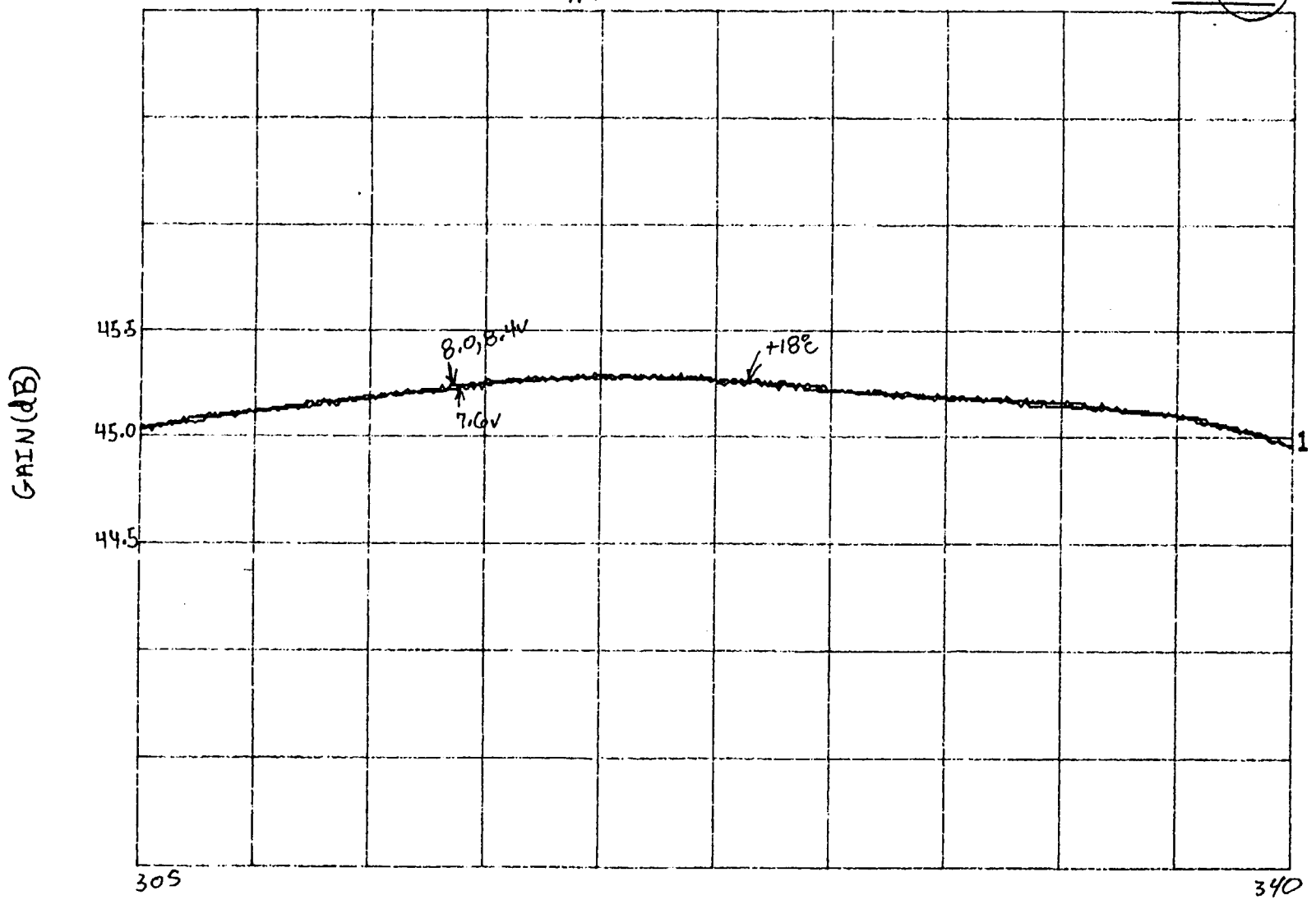
GAIN-VOLTAGE SENSITIVITY VS. FREQ.

VERTICAL CALIBRATION 0.5dB INCH

TEMPERATURE AS NOTED DEG.C.

TECH SMT143 DATE 2-14-97

P/N 1331579-12



MODEL UD315301 S/N 108

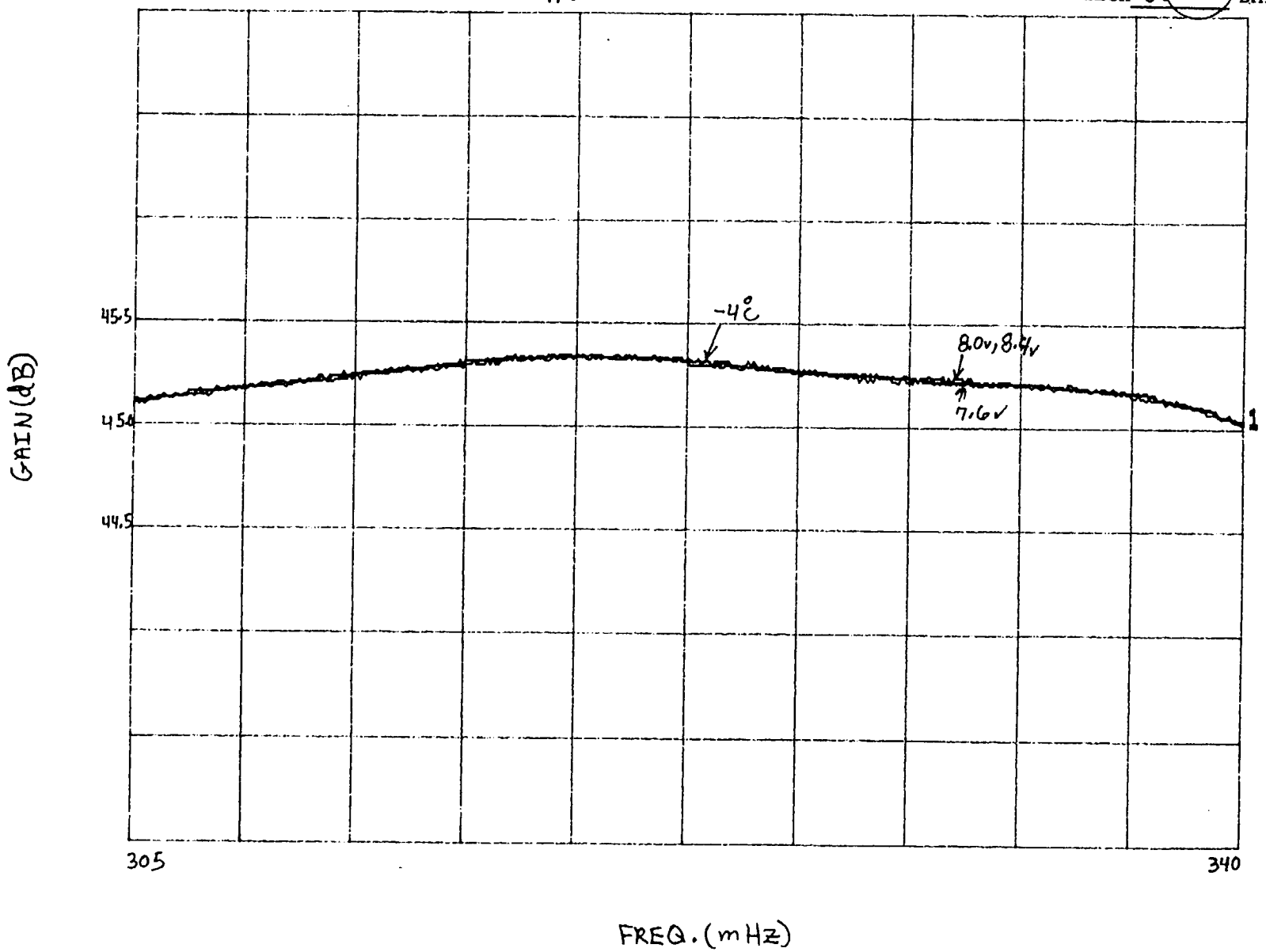
GAIN-VOLTAGE SENSITIVITY VS. FREQ.

VERTICAL CALIBRATION 0.5dB INCH

TEMPERATURE AS NOTED DEG.C.

TECH SA T143 DATE 2-14-97

P/N 1331579-12



MODEL UD3153O1 S/N 108

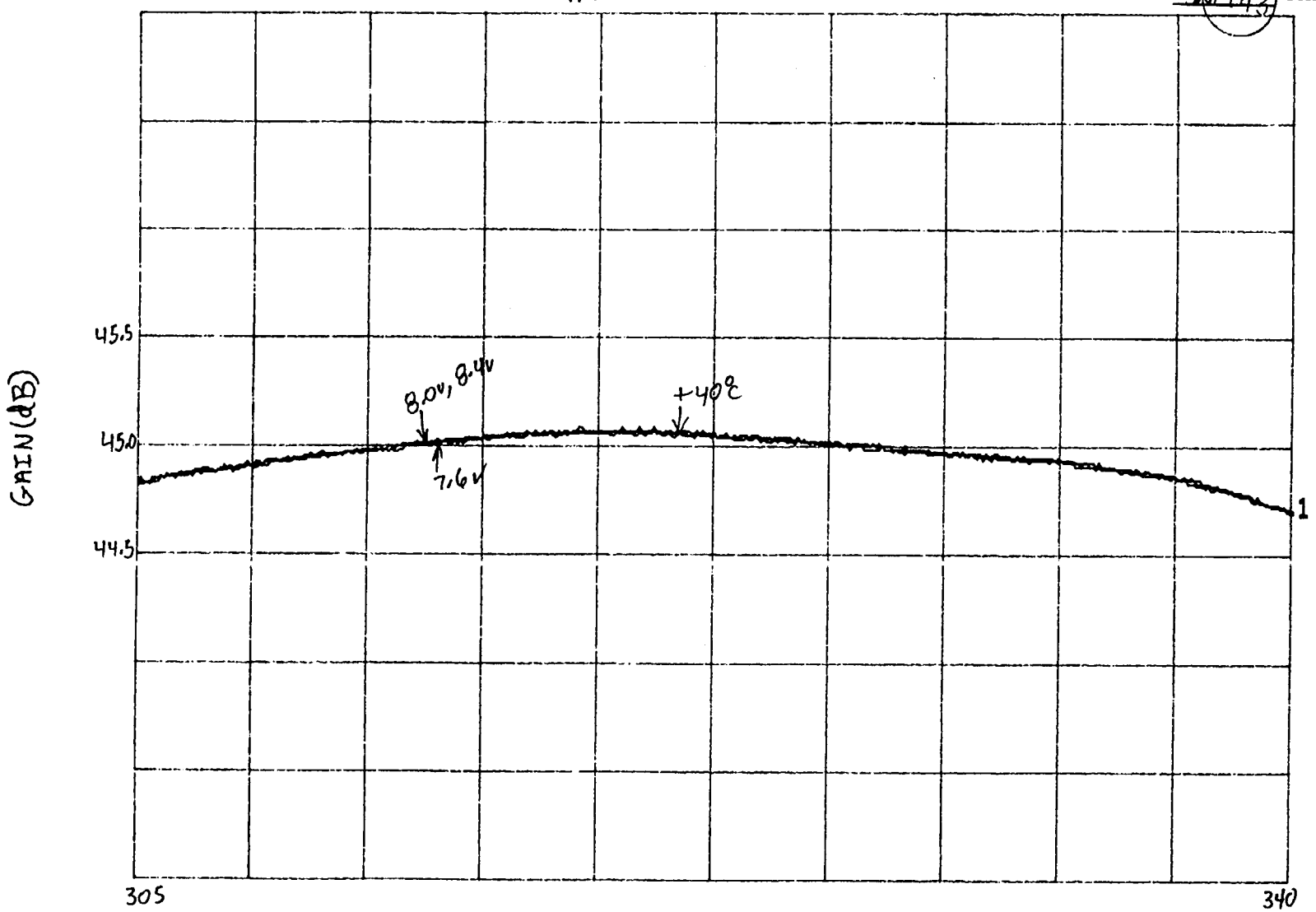
GAIN-VOLTAGE SENSITIVITY VS. FREQ.

VERTICAL CALIBRATION 0.5dB INCH

TEMPERATURE AS NOTED DEG.C.

TECH GT143 DATE 2-14-97

P/N 1331579-12



Channel 14 Amplifier

IF Amplifier (P/N:1331579-13, S/N: 108)

APPENDIX C
ATP1777 DATA SHEET
MODEL NUMBER UD315302
AEROJET P/N 1331579-13

S/N 108

PARA	TEST	SPECIFICATION	+18°C	-4°C	+40°C	DATE
4.1.1	Examination of Product		Accept X Reject ___			2-14-97
4.2.2	* Current Limiting	200 mA maximum Reg. VOLTAGE= N/A VDC Total R= N/A ohm max. current draw =	N/A mA			N/A
4.4	Electrical Test					
4.4.1	* Polarity Reversal Protection	No Damage	Current N/A mA Accept N/A Reject ___			N/A
	Short Open Protection	No Damage	Accept X Reject ___			2-14-97
	Output Coupling	Output shall be AC coupled	Accept X Reject ___			2-14-97
4.4.2	Gain vs. Freq. 315 MHz to 330 MHz	48.5dB Min., 49.5dB Max. -4°C to +40°C Attach x-y plot	Max 49.13 dB Min 49.01 dB Accept X Reject ___	Max 49.32 dB Min 49.20 dB Accept X Reject ___	Max 48.81 dB Min 48.68 dB Accept ✓ Reject ___	2-14-97
	Gain Flatness	.5 dB Maximum Worse Case	Accept X Reject ___ X dB	Accept X Reject ___ 0.12 dB	Accept X Reject ___ 0.13 dB	2-14-97
	Gain Temp. Sensitivity	±.44 dB from -4°C to +40°C Worse Case	Accept X Reject ___	Accept X Reject ___ 0.20 dB	Accept X Reject ___ 0.34 dB	2-14-97
4.4.3	Gain-Voltage Sensitivity	≤.5dB/v Worse Case	0.03 dB	0.04 dB	0.03 dB	
	Input Currents	± .2dB for 7.6 to 8.4 Vdc 55ma MAX.	7.6v 48.3 mA 8.0v 48.9 mA 8.4v 49.6 mA	47.2 mA 48.0 mA 48.5 mA	49.1 mA 49.8 mA 50.5 mA	
		Attach X-Y Plot	Accept X Reject ___	Accept X Reject ___	Accept X Reject ___	2-14-97

NOTE: * TEST REQUIRED ON PROTOFLIGHT UNIT ONLY

APPENDIX C
ATP1777 DATA SHEET
MODEL NUMBER UD315302
AEROJET P/N 1331579-13

S/N 108

PARA	TEST	SPECIFICATION	+18°C	-4°C	+40°C	DATE
4.4.7	Compression	1 dB maximum Compression AT +10 dBm Output Power	Accept X Reject ___			
		315 MHz	0.50 dB	0.50 dB	0.45 dB	
		322.5 MHz	0.50 dB	0.50 dB	0.45 dB	
		330 MHz	0.55 dB	0.60 dB	0.50 dB	2-14-97
4.4.8	Stability	Unconditionally Stable	Accept X Reject ___			2-14-97
4.4.9	Start-up	Capable of starting operation at -30°C and +60°C with a maximum current draw of 60 mA	Accept X Reject ___			
		Maximum Current	50.4 mA			2-14-97

NOTE: Review all recorded data and signify acceptance below.

Technician S K Thomas (T143) Date: 2-14-97

Quality Assurance Irene Luna (A 34) Date: 2-18-97

CSI: Mike Mun (QC 176) Date: 2-19-97

GSI: Marjorie Thomas (3387) Date: 2/14/97

MODEL UD315302 S/N 108

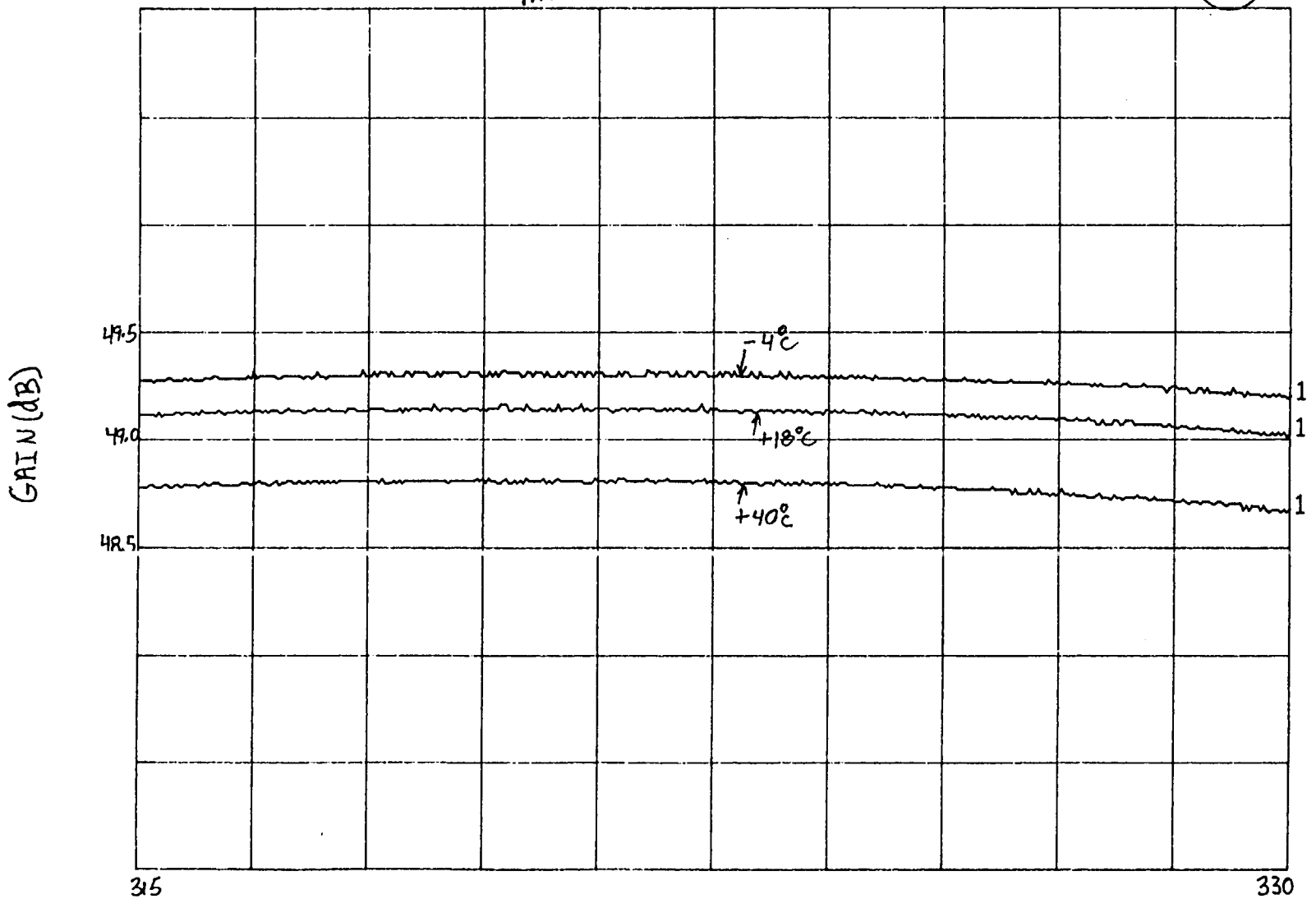
GAIN VS FREQUENCY

VERTICAL CALIBRATION .5 dB INCH

TEMPERATURE AS NOTED DEG.C.

TECH SM T143 DATE 2-14-97

P/N 1331579-13



MODEL UD315302 S/N 108

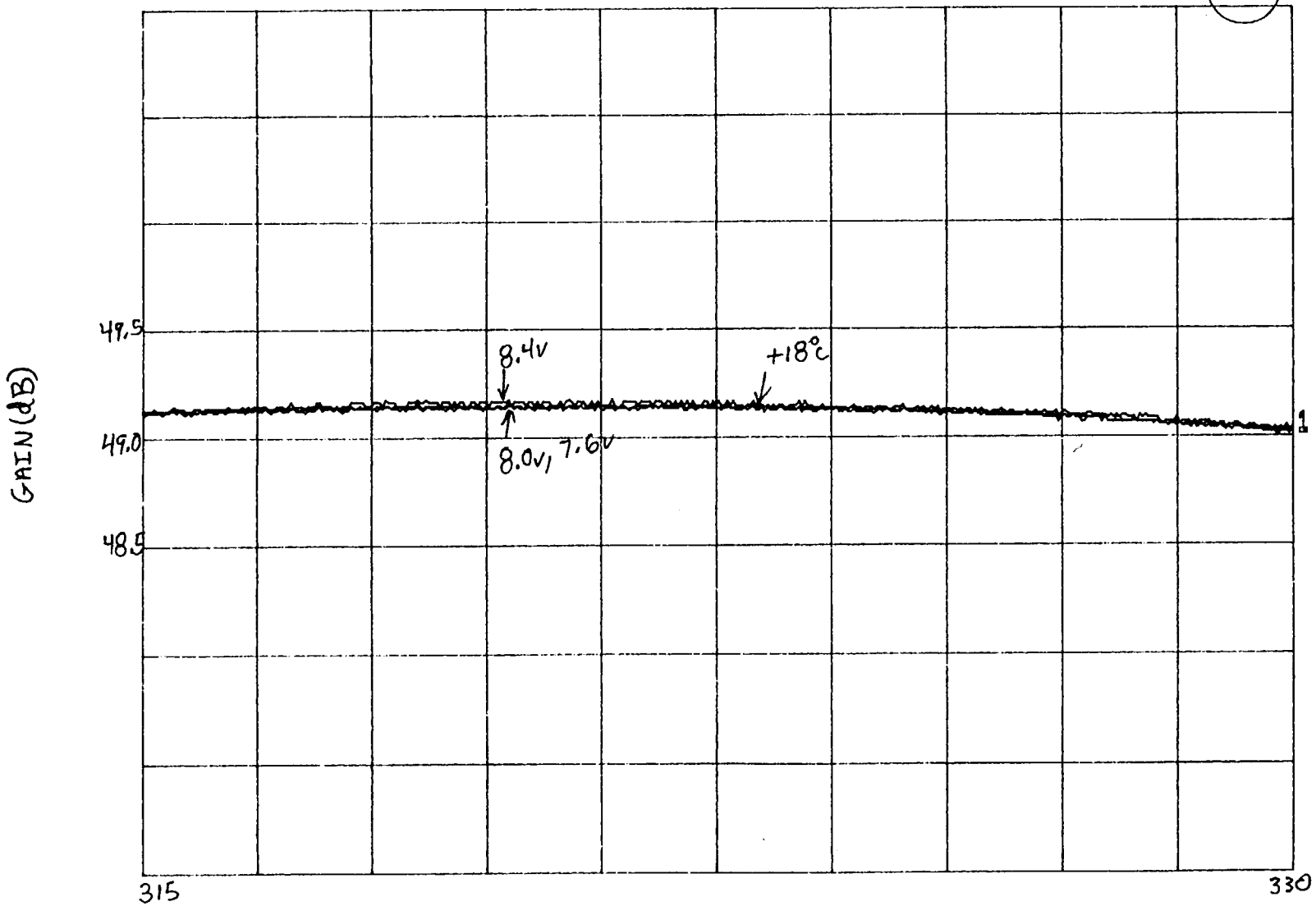
GAIN-VOLTAGE SENSITIVITY VS. FREQ.

VERTICAL CALIBRATION 0.5dB INCH

TEMPERATURE AS NOTED DEG.C.

TECH SA T143 DATE 2-14-97

P/N 1331579-13



MODEL UD 315302 S/N 108

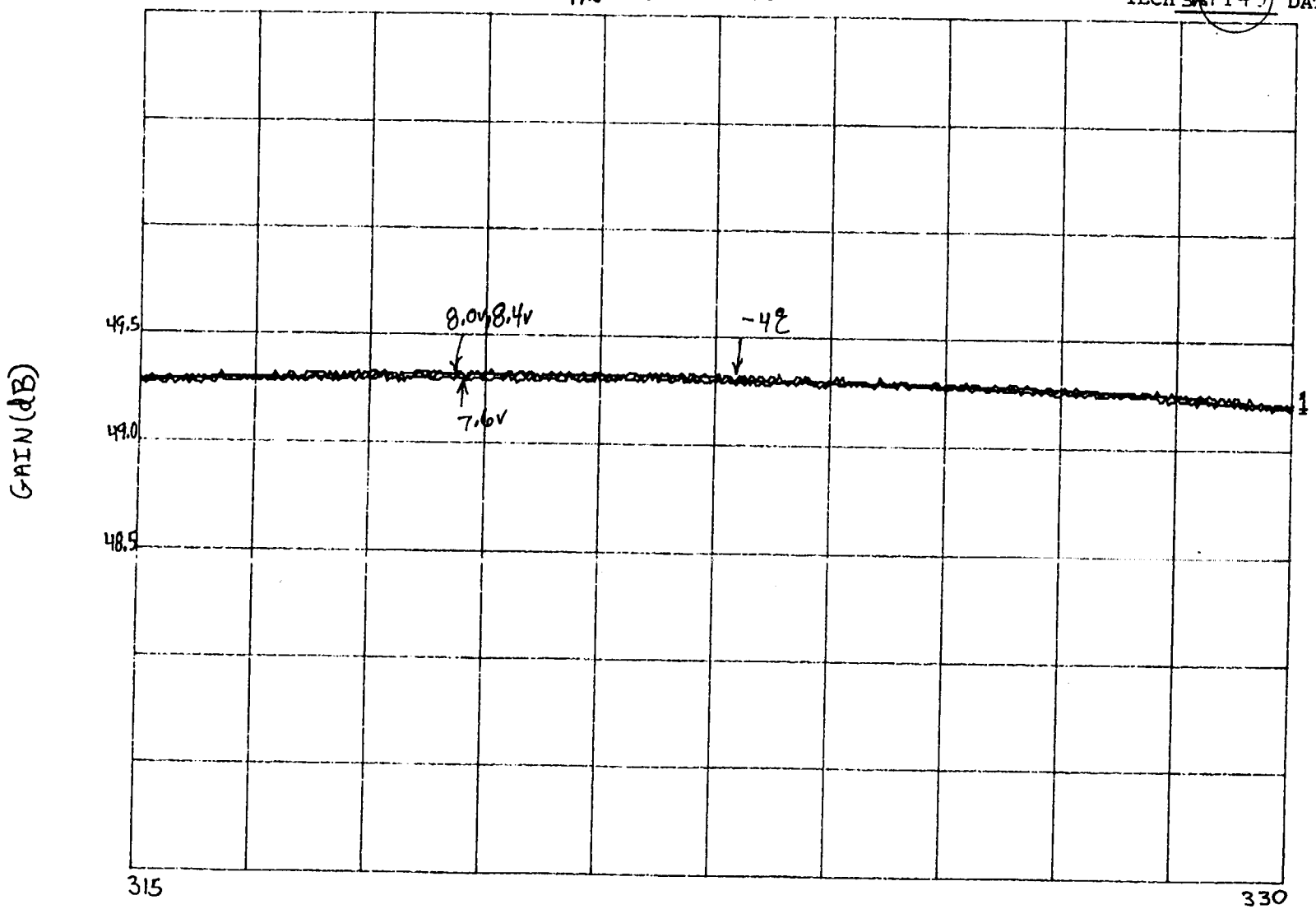
GAIN-VOLTAGE SENSITIVITY VS. FREQ.

VERTICAL CALIBRATION 0.5dB INCH

TEMPERATURE AS NOTED DEG.C.

TECH S. T143 DATE 2-14-97

P/N 1331579-13



MODEL UD315302 S/N 108

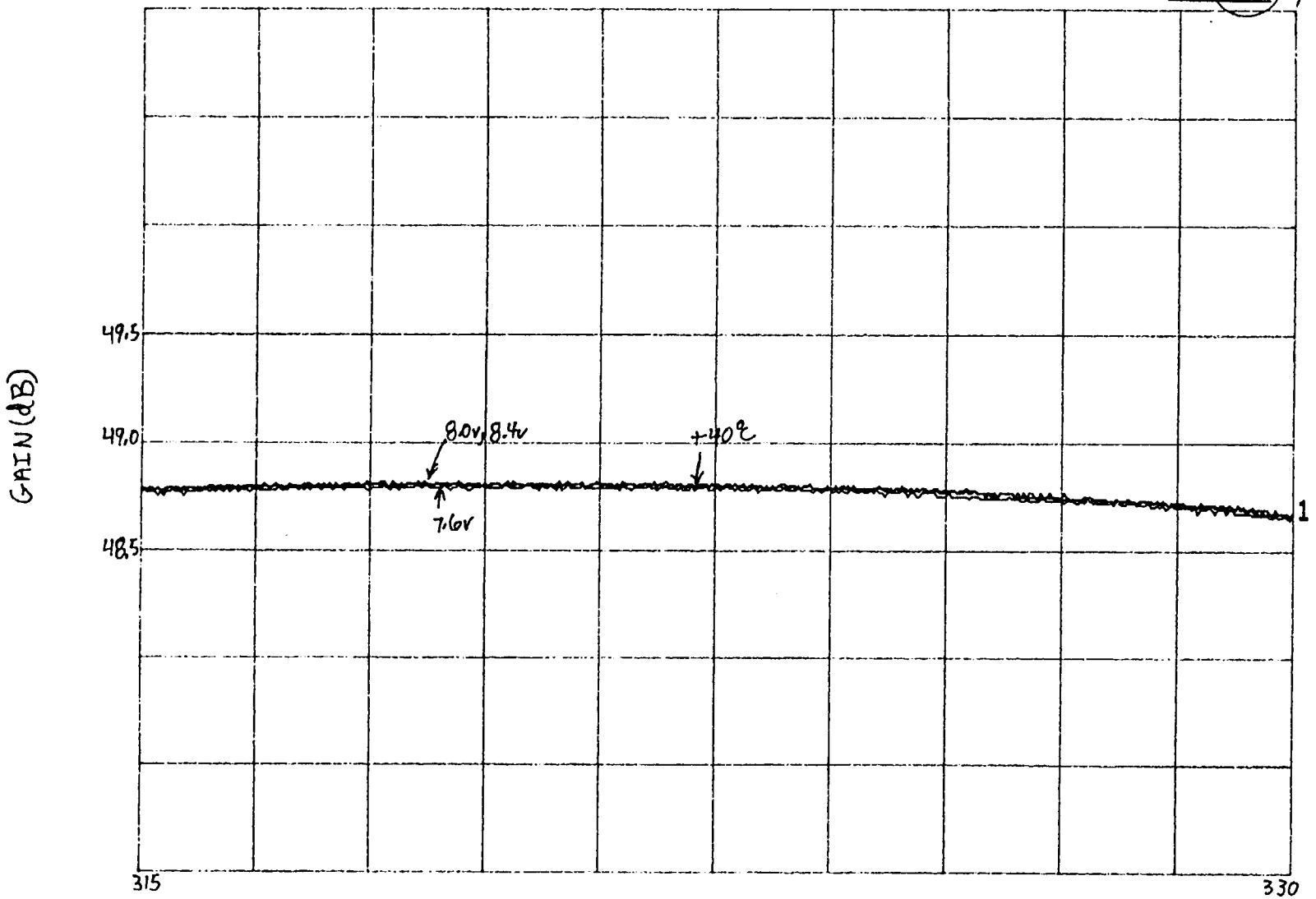
GAIN-VOLTAGE SENSITIVITY VS. FREQ.

VERTICAL CALIBRATION 0.5dB INCH

TEMPERATURE AS NOTED DEG.C.

TECH SW T143 DATE 2-14-97

P/N 1331579-13



Channel 15 Mixer/Amplifier

Mixer/Amplifier (P/N: 1331562-20, S/N: 7A20)

TEST DATA SHEET NO. 6. AMPLIFIER TESTS

GAIN FLATNESS TEST: ATP PARAGRAPH 5.1.3

GAIN FLATNESS (dB)ppK	SPEC. GAIN FLATNESS (dB)ppK	ACC	REJ
1.10	1.00	QA 1	

GAIN VERSUS VOLTAGE SENSITIVITY TEST: ATP PARAGRAPH 5.1.4

AMPLIFIER VOLTAGE	GAIN READING (dBm)	ΔG/ΔV	SPEC. ΔG/ΔV	ACC	REJ
9.96	57.61	0.875	2.0	QA 1	
10.00	57.64				
10.04	57.68				
ΔGv =	0.07 dB				

	DATE	ACC	REJ
SPACEK QA	3-2-98	QA 1	

PART NO. 1331562-20G

SER NO. 7A20

TESTED BY: [signature]

END DATE: 1-12-98

END TIME: 1600

TEST FAILURE: _____

FAILURE ANALYSIS NO. _____

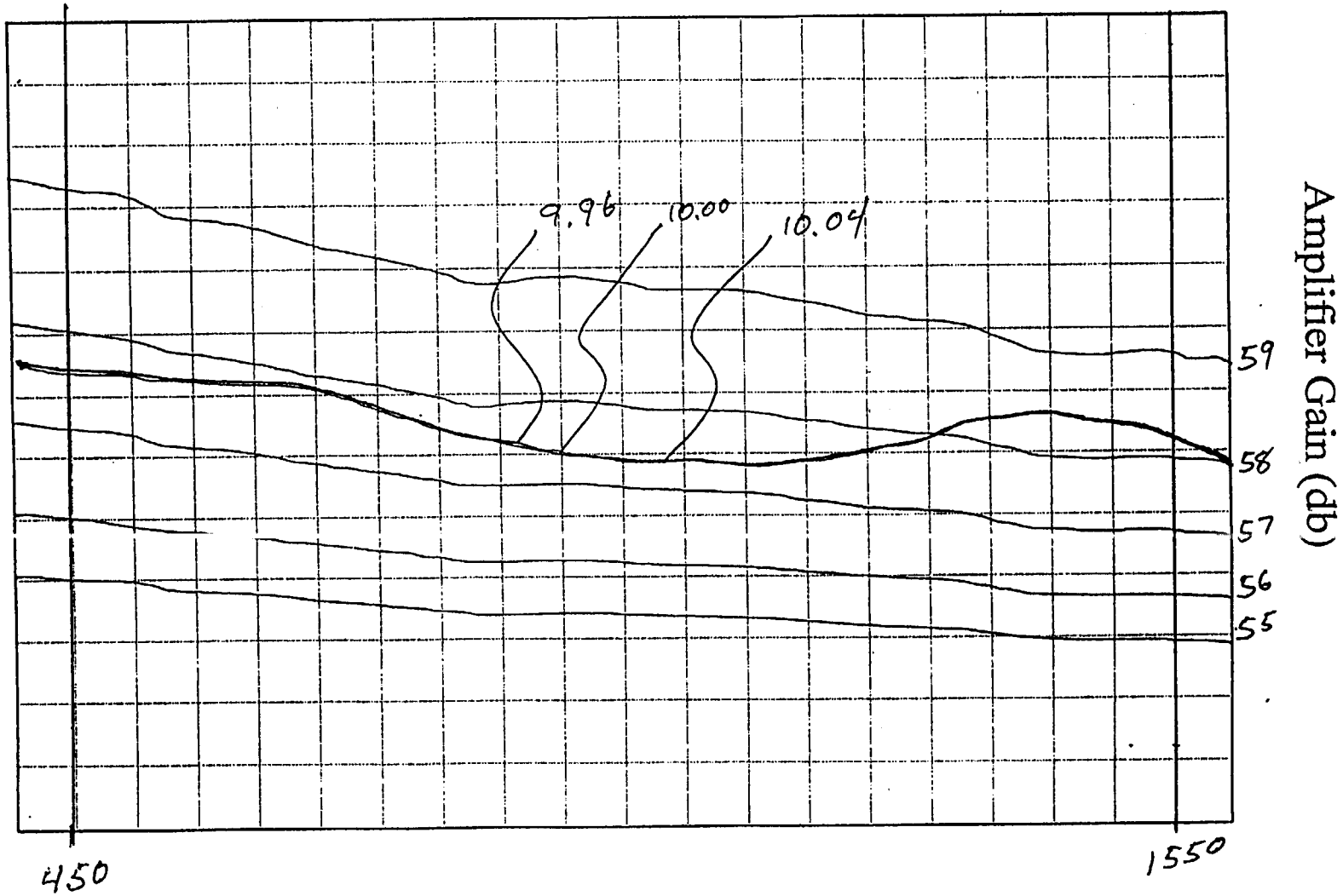
Spacek Labs, Inc.
212 E. Gutierrez St.
Santa Barbara,CA,93101

SPACEK LABS, INC.
MM-WAVE TECHNOLOGY

Amplifier Gain vs Voltage

Model No. 1331562 -206 -777
Serial No. 7A20
Date 1-12-98
Tested By 777

Amb Temp 23°c



TEST DATA SHEET NO. 7. AMPLIFIER TESTS

GAIN VERSUS TEMPERATURE SENSITIVITY TEST: ATP PARAGRAPH 5.1.5

Nominal Temperature (°C)	Relative Gain	ΔG/ΔT	SPEC	ACC	REJ
T1 +40	G_{T1} 59.25				
		* 0.029	0.035dB/°C	QA 1	
T2 +28	G_{T2} 58.85				
		* 0.040	0.020dB/°C		QA 1
T3 +8	G_{T3} 58.05				
		* 0.039	0.035dB/°C		QA 1
T4 -6	G_{T4} 57.50				

* Perform the following calculations and record on the TDS

$$\Delta G/\Delta T = \frac{G_{Ti} - G_{Ti+1}}{T_i - T_{i+1}} \qquad i = 1,2,3,4$$

ΔG_T = 1.75 dB

$\Delta G_{TOTAL} = \Delta G_V + \Delta G_T + 0.4 =$ 2.20 dB Spec 1.4dB ACC____ REJ____ QA 1

DATE ACC REJ

PART NO. 1331562-206 SPACEK QA 3-2-98 QA 1

SER NO. 7A20 TEST FAILURE: _____

TESTED BY: [illegible] FAILURE ANALYSIS NO. _____

END DATE: 1-12-98

END TIME: 1600

Spacek Labs, Inc.
212 E. Gutierrez St.
Santa Barbara,CA,93101

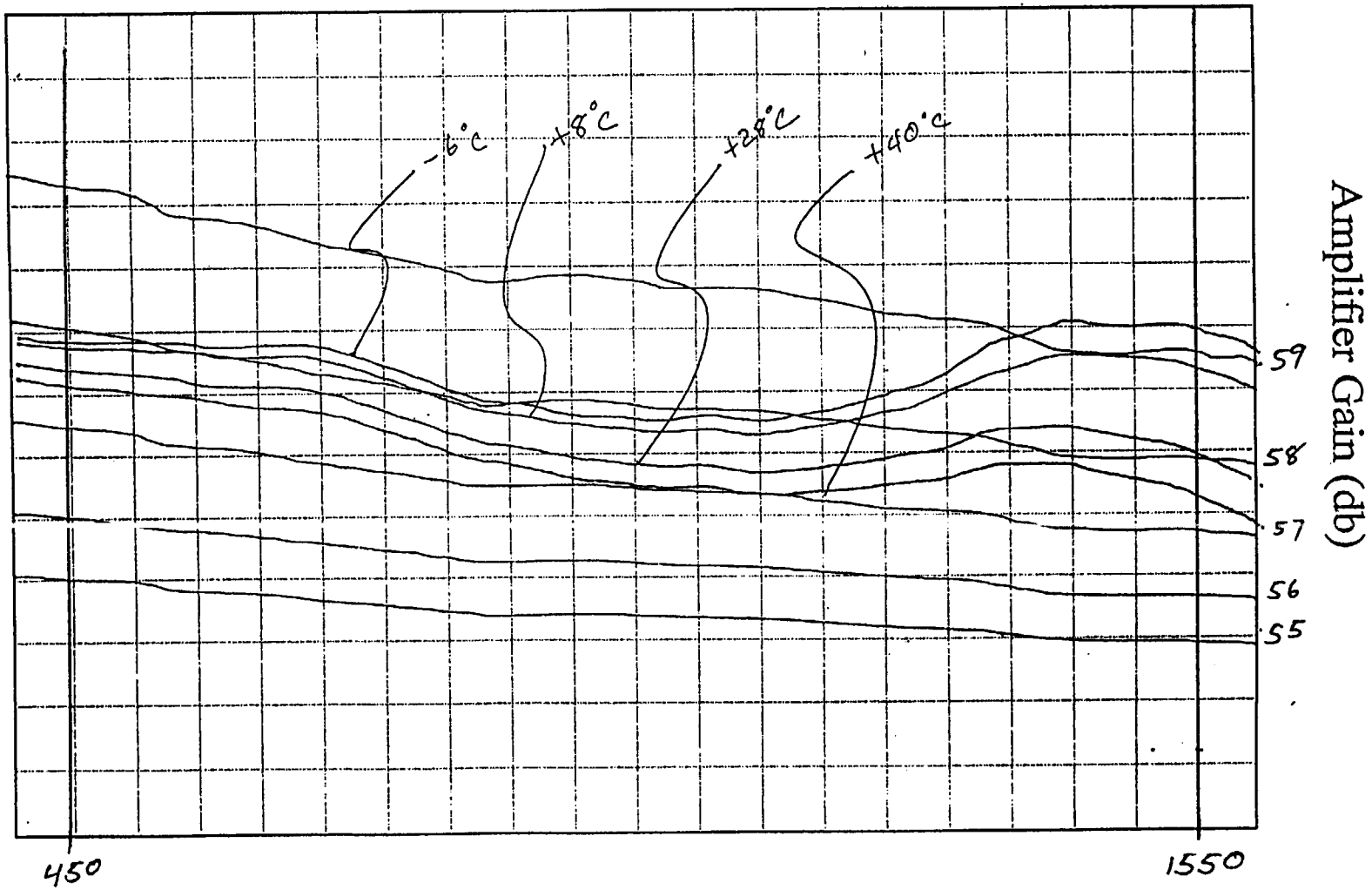
SPACEK LABS, INC.
MM-WAVE TECHNOLOGY

Amplifier Gain vs Temp

206

Model No. 133/562 ~~Ref 6~~
Serial No. 7A20
Date 1-12-98
Tested By 7TW

Amb Temp 23°C



QA 1

TEST DATA SHEET NO. 8. AMPLIFIER TESTS

OUTPUT 1.0 dB COMPRESSION POINT TEST: ATP PARAGRAPH 5.1.6

DASH #

11	12	13	14	15	16	17	18	19	20	FREQ. (MHz)	P2 COMP (dBm)	OUTPUT COMP. at+10(dBm)	SPEC. COMP. PT.(dBm)	ACC	REJ
X	X	X	X		X	X	X	X		10					
				X						20					
	X	X								50					
X	X	X	X	X	X	X	X			100					
X										150					
			X	X	X	X	X	X		200					
								X		400					
									X	500	-2.8	0.2	1.0	OA	
									X	1000	-2.7	0.3	1.0	OA	
									X	1500	-2.3	0.7	1.0	OA	

AMPLIFIER NOISE FIGURE AND TOTAL POWER TEST: ATP PARAGRAPH 5.1.7

DATE: 1-12-98 AMBIENT ROOM TEMPERATURE °C: 23°C

AMPLIFIER OUTPUT POWER AMBIENT (dBm)	AMPLIFIER OUTPUT POWER (-77 K)(dBm)	Y FACTOR (dB)	AMPLIFIER NOISE FIGURE (dB)
24.9	27.5	2.6	2.18

Above data taken with Daden filter attached (except -19) .

Intermediate test results for information only

		DATE	ACC	REJ
PART NO. 1331562-206	SPACEK QA	3-2-98	OA	

SER NO. 7A20 TEST FAILURE: _____

TESTED BY: TTT FAILURE ANALYSIS NO. _____

END DATE: 1-12-98

END TIME: 1600

Spacek Labs, Inc.
212 E. Gutierrez St.
Santa Barbara,CA,93101

TEST DATA SHEET NO. 13. MIXER-AMPLIFIER ASSEMBLY TESTS

NOISE FIGURE, TOTAL POWER AND CURRENT VS. TEMPERATURE TEST: ATP PARA 5.4.8.

DATE: 2-27-98 AMBIENT ROOM TEMPERATURE °C: +22

UUT TEMP °C.	UUT CURRENT	MIXER-AMP. OUTPUT POWER (AMBIENT) (dBm)	MIXER-AMP. OUTPUT POWER (77 DEG K) (dBm)	Y FACTOR (dB)	MIXER-AMP. NOISE FIGURE (dB)	SPEC. MIXER-AMP. NOISE FIGURE (dB)	ACC	REJ
-6	112	-24.50	-25.40	0.90	6.0	6.5	QA 1	
+8	113	-24.60	-25.50	0.90	6.0	6.5	QA 1	
+28	114	-24.70	-25.60	0.90	6.0	6.5	QA 1	
+40	114	-24.90	-25.75	0.85	6.3	6.5	QA 1	

Noise figure change 0.3 dB Spec is .5dB peak to peak on -20 ACC QA 1 REJ _____

NOTE: *Above data to be taken with the Daden filter, except on the -19 unit.*

NEΔT-NOISE POWER STABILITY TEST: ATP PARAGRAPH 5.4.9

Date: 2-26-98 Ambient Room Temperature °C: 25

Attach computer generated *NEΔT* spreadsheet to this test data sheet.

Record the calculated Nps(K) from spreadsheet data: 0.046

Record Nps(K) 0.15 for dash number from Aerojet specification AE-24869, Table II.
Accept units if calculated Nps(K) is less than or equal to specified Nps(K), otherwise reject.

ACC QA 1 REJ _____

	DATE	ACC	REJ
SPACEK QA	3-2-98	QA 1	

PART NO. 1331562-205

SER NO. 7A20

TESTED BY: [signature]

END DATE: 2-26-98

END TIME: 1600

TEST FAILURE: _____

FAILURE ANALYSIS NO. _____

Spacek Labs, Inc.
212 E. Gutierrez St.
Santa Barbara, CA, 93101

SUBSYSTEM-LEVEL TEST DATA

CENTER FREQUENCY OF LOs

Channel No.	3	4	5	6	7	8	9-14 ***	15
Specification (GHz) *	50.3	52.8	53.596	54.4	54.94	55.5	57.290344	89.0
Setting Accuracy (+/-GHz)	0.008	0.003	0.003	0.003	0.003	0.008	0.000086	0.08
Measured (GHz) **	50.301	52.800	53.596	54.400	54.940	55.501	57.290327 57.290315	88.984

* Specification in vacuum condition.

** Measured at ambient pressure (standard atmosphere).

*** Measured data for PLO No. 1 and No.2.

TEST DATA

FOR

AMSU-A1-2 (P/N: 1356409-1, S/N: F02)

TEST DATA SHEET 2

LO Frequency Test Data (Paragraph 3.5.1) (A1-2)

Test Setup Verified: J. Juraney (Signature) Baseplate Temperature (T_B) 27.8 °C

Component	Channel No.	V_b(V)	I_b(mA)	P_{dc}(mW)			f_o(GHz)		
				Required (Max)	Measured	Pass/ Fail	Required	Measured	Pass/ Fail
LO	3	9.98	178.3	2,700	1779.4	P	50.300 ± 0.008	50.301	P
	4	10.02	176.6	2,700	1769.5	P	52.800 ± 0.003	52.800	P
	5	10.00	183.3	2,700	1833.0	P	53.596 ± 0.003	53.596	P
	8	9.98	190.2	2,700	1898.2	P	55.500 ± 0.008	55.501	P
Mixer/ Amps	All	10.02	174.8	1,800	1751.5				
TOTAL				12,600	9031.6				

Pass = P, Fail = F

Part No.: 1356409-1

Serial No.: F02

Test Engineer: [signature]

Quality Assurance: [signature] 8/18/98 (TA 228)

Date: 8/8/98

TEST DATA SHEET 3

LO Frequency Test Data (Paragraph 3.5.1) (A2)

Test Setup Verified:_____ Baseplate Temperature (T_B) _____°C
Signature

Component	Channel No.	V_b(V)	I_b(mA)	P_{dc}(mW)			f_o(GHz)		
				Required (Max)	Measured	Pass/ Fail	Required	Measured	Pass/ Fail
LO	1			2,000			23.800 ± 0.008		
	2			2,100			31.400 ± 0.008		
Mixer/ Amps	All			900					
TOTAL				5,000					

Pass = P, Fail = F

Part No.:_____ Test Engineer:_____

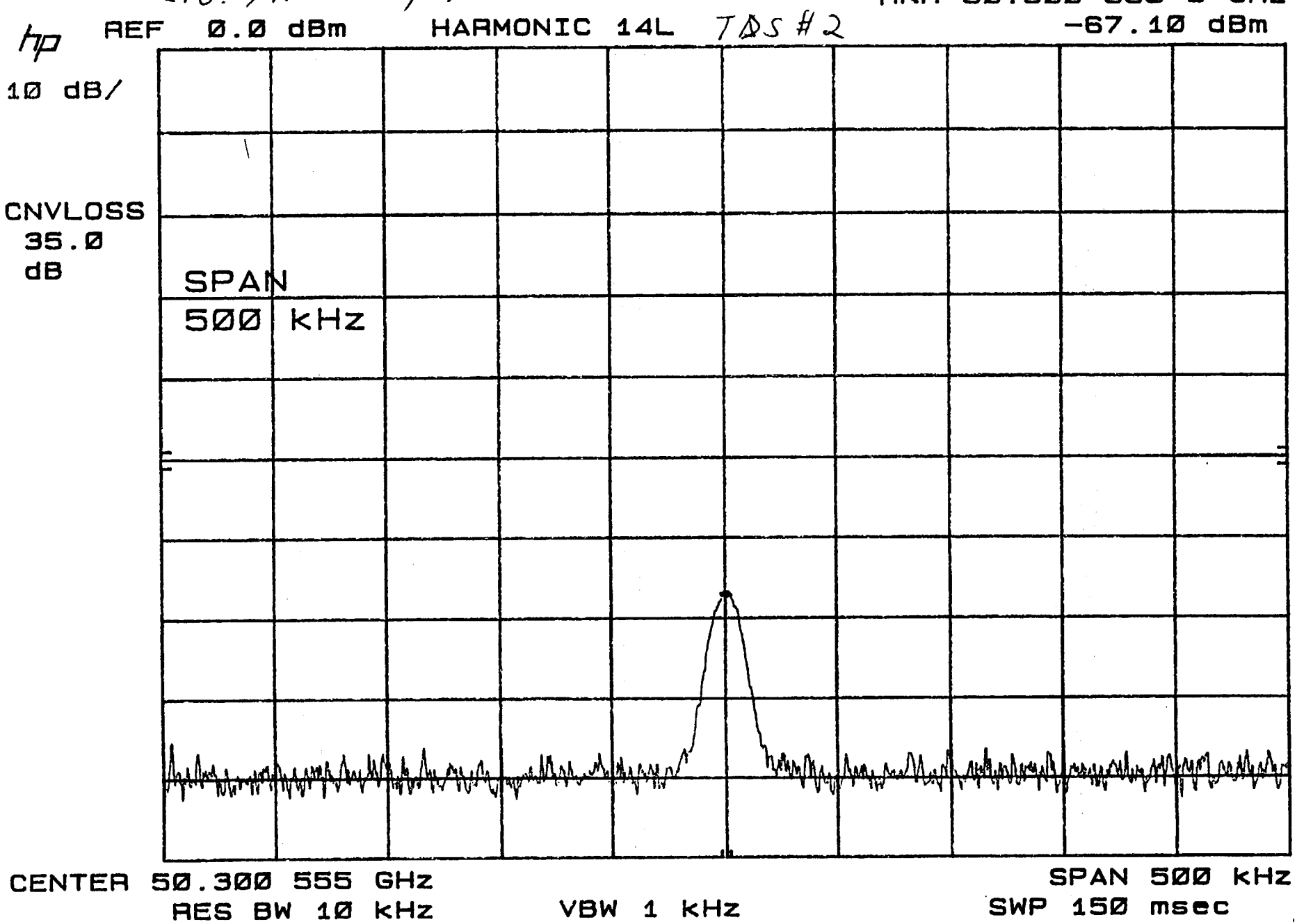
Serial No.:_____ Quality Assurance:_____

Date:_____

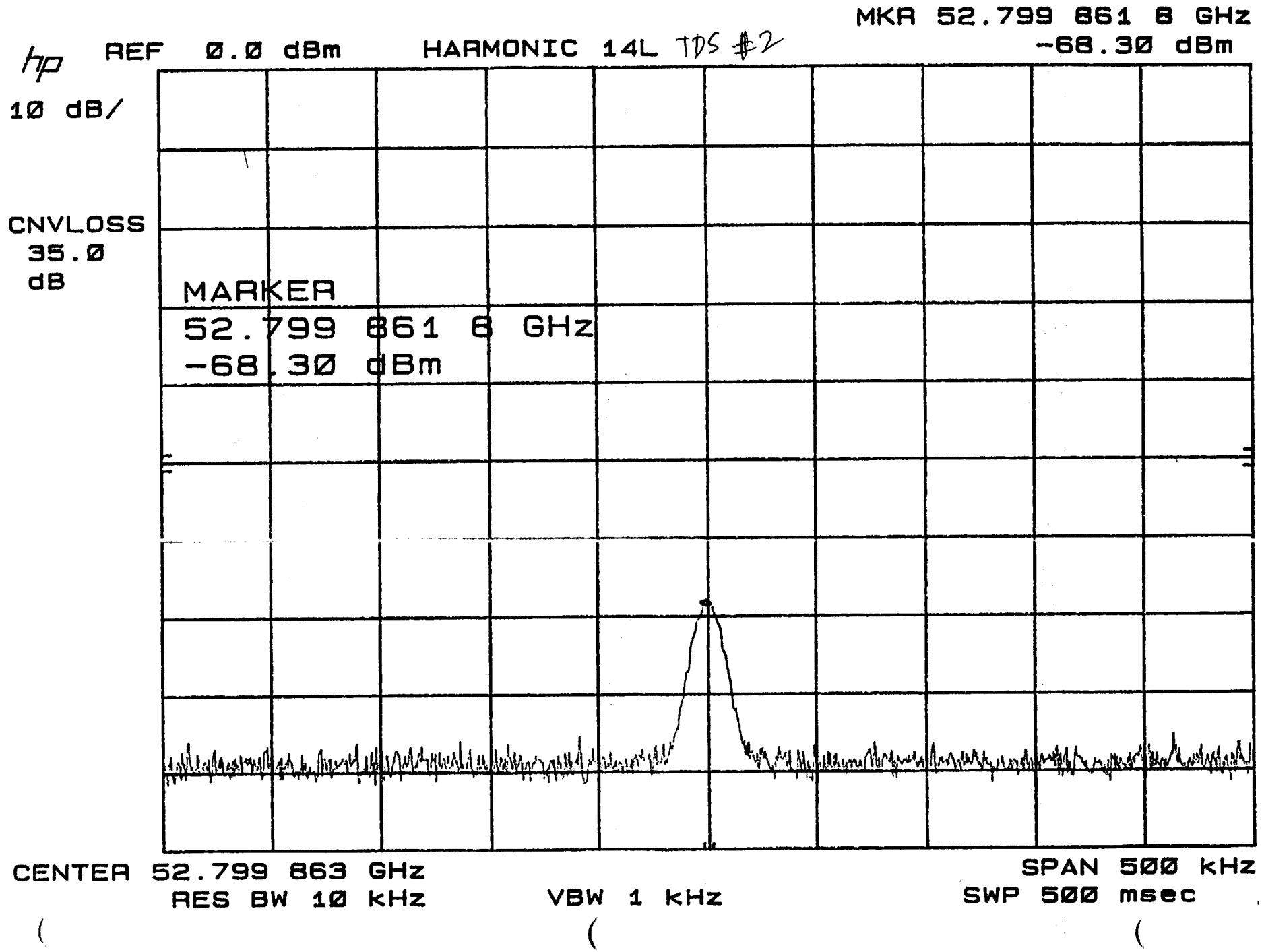
AMSU-A1-2, S/N: F02
L.O. FREQUENCY, CH 3

FOR REFERENCE ONLY

8/8/98



L.O. Freq. ch. 4 , AMSU-A1-2 , S/N 1F02 **FOR REFERENCE ONLY** 8/8/96

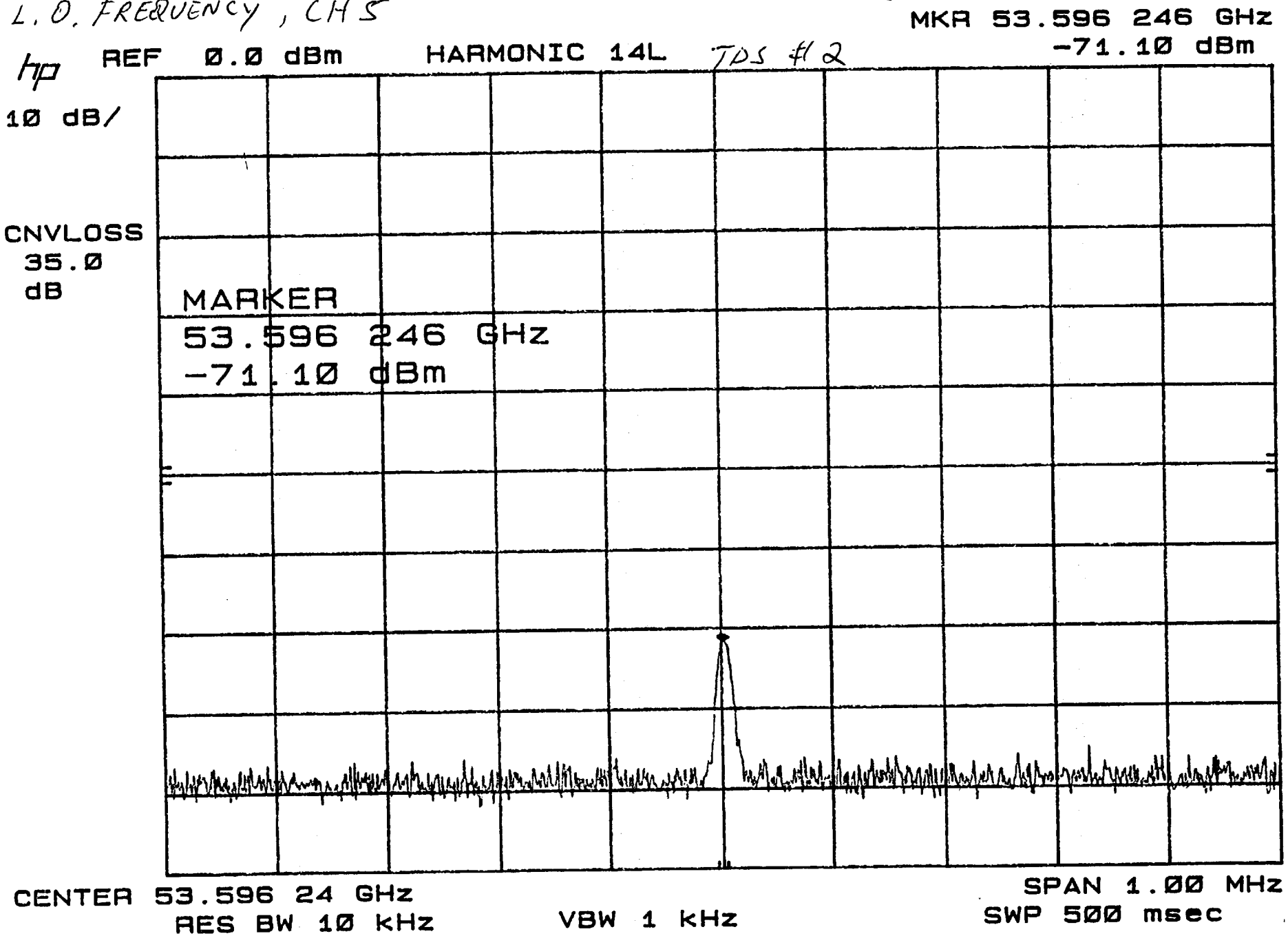


AMSU-A1-2, S/N: F02

FOR REFERENCE ONLY

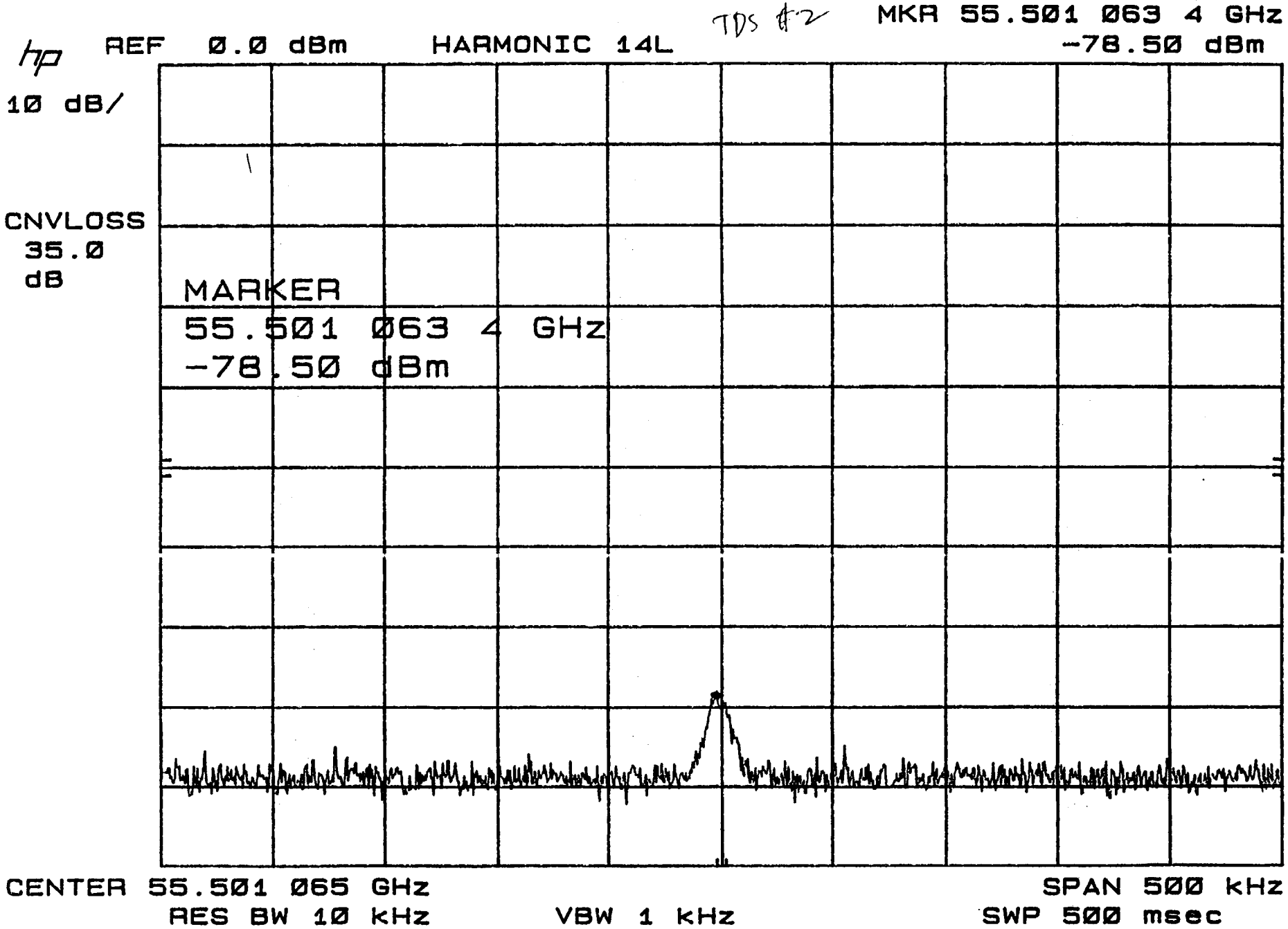
8/8/98

L.O. FREQUENCY, CH 5



L.O. Freq. ch.8, AMSU-A1-2, S/N: F02 **FOR REFERENCE ONLY** 8/8/98

TDS #2



TEST DATA SHEET 4

IF Output Power Test Data (Paragraph 3.5.2) (A1-1)

Test Setup Verified:_____ Baseplate Temperature (T_B) _____°C
Signature

Component	Channel No.		V_b(V)	I_b(mA)	P_o(dBm)	Atten (dB)	P_o(dBm)		
							Required	Measured	Pass/ Fail
LO	6						-27.0 ± 1.0		
	7						-27.0 ± 1.0		
	LO No. 1	9	Positive				-27.0 ± 1.0		
		10					-27.0 ± 1.0		
		11					-27.0 ± 1.0		
		12	Negative				-27.0 ± 1.0		
		13					-27.0 ± 1.0		
		14					-27.0 ± 1.0		
	LO No. 2	9	Positive				-27.0 ± 1.0		
		10					-27.0 ± 1.0		
		11					-27.0 ± 1.0		
		12	Negative				-27.0 ± 1.0		
		13					-27.0 ± 1.0		
		14					-27.0 ± 1.0		
	15						-27.0 ± 1.0		
Mixer/ Amps	All								
IF Amps	All								

Pass = P, Fail = F

Part No.:_____ Test Engineer:_____

Serial No.:_____ Quality Assurance:_____

Date:_____

TEST DATA SHEET 5
IF Output Test Data (Paragraph 3.5.2) (A1-2)

Test Setup Verified: A Turo
Signature

Baseplate Temperature (T_B) 28.6 °C

Compo-nent	Channel No.	V_b(V)	I_b(mA)	P_o(dBm)	Atten (dB)	P_o(dBm)		
						Required	Measured	Pass/ Fail
LO	3	9.98	178.3	-23.85	3	-27.0 ± 1.0	-26.75	P
	4	10.02	176.6	-19.39	8	-27.0 ± 1.0	-27.53	P
	5	10.00	183.3	-20.11	7	-27.0 ± 1.0	-27.27	P
	8	9.98	190.2	-20.33	7	-27.0 ± 1.0	-27.48	P
Mixer/ Amps	All	10.02	174.8					

Pass = P, Fail = F

art No.: 1356409-1

erial No.: F02

Test Engineer:

Quality Assurance: 8/18/98

Date: 8/8/98

TEST DATA SHEET 7 (Sheet 2 of 2)

Bandpass Characteristics Test Data (Paragraph 3.5.3) (A1-1)

Test Setup Verified:_____ Baseplate Temperature (T_B) _____°C
Signature

Component		Channel No.	V_b(V)	I_b(mA)	40 dB BW Frequency (MHz)		40 dB BW Frequency (MHz)		Pass/Fail
					Lower	Higher	Required MAX (Ref Only)	Measured	
LO		6					520		
		7					520		
	LO	9	Positive				429		
	No.	10					101		
	1	11					47		
		12	Negative				21		
		13					10		
		14					4		
	LO	9	Positive				429		
	No.	10					101		
	2	11					47		
		12	Negative				21		
		13					10		
		14					4		
		15					7800		
Mixer/Amps		All							
IF Amps		All							

Part No.:_____ Test Engineer:_____

Serial No.:_____ Quality Assurance:_____

Date:_____

TEST DATA SHEET 8 (Sheet 1 of 2) :
Bandpass Characteristics Test Data (Paragraph 3.5.3) (A1-2)

Test Setup Verified: Q Fung (Signature) Baseplate Temperature (T_B) 28.7 °C

Component	Channel No.	V_b(V)	I_b(mA)	3 dB BW Frequency (MHz)		3 dB BW Frequency (MHz)		Pass/ Fail
				Lower	Higher	Required Max.	Measured	
LO	3	9.98	178.3	8.8	88.6	90	79.8	P
	4	10.02	176.6	7.8	199.0	200	191.2	P
	5	10.00	183.3	30.8	200.0	170	169.2	P
	8	9.98	190.2	7.9	163.1	163	155.2	P
Mixer/ Amps	All	10.02	174.8					

Part No.: 1356409-1

Serial No.: F02

Test Engineer: [signature]

Quality Assurance: [signature] 8/18/98

Date: 8/8/98

TEST DATA SHEET 8 (Sheet 2 of 2)
Bandpass Characteristics Test Data (Paragraph 3.5.3) (A1-2)

Test Setup Verified: J. Tsung (Signature) Baseplate Temperature (T_B) 28.1 °C

Compo-nent	Channel No.	V_b(V)	I_b(mA)	40 dB BW Frequency (MHz)		40 dB BW Frequency (MHz) (Ref. Only)		Pass/ Fail
				Lower	Higher	Required Max.	Measured	
LO	3	9.98	178.3	3.5	99.6	234	96.1	P
	4	10.02	176.6	2.3	222.8	234	220.5	P
	5	10.00	183.3	18.3	218.3	221	200.0	P
	8	9.98	190.2	2.4	181.0	429	178.6	P
Mixer/ Amps	All	10.02	174.8					

Part No.: 1356409-1

Serial No.: F02

Test Engineer: [signature]

Quality Assurance: [signature] 8/18/98

Date: 8/8/98

TEST DATA SHEET 9

Bandpass Characteristics Test Data (Paragraph 3.5.3) (A2)

Test Setup Verified:_____ Baseplate Temperature (T_B) _____°C
Signature

Compo-nent	Channel No.	V_b(V)	I_b(mA)	3 dB BW Frequency (MHz)		3 dB BW Frequency (MHz)		Pass/ Fail
				Lower	Higher	Required MAX.	Measured	
LO	1					135		
	2					90		
Mixer/ Amps	All							

Compo-nent	Channel No.	V_b(V)	I_b(mA)	40 dB BW Frequency (MHz)		40 dB BW Frequency (MHz) (Ref. Only)		Pass/ Fail
				Lower	Higher	Required MAX.	Measured	
LO	1					351		
	2					234		
Mixer/ Amps	All							

Part No.:_____ Test Engineer:_____

Serial No.:_____ Quality Assurance:_____

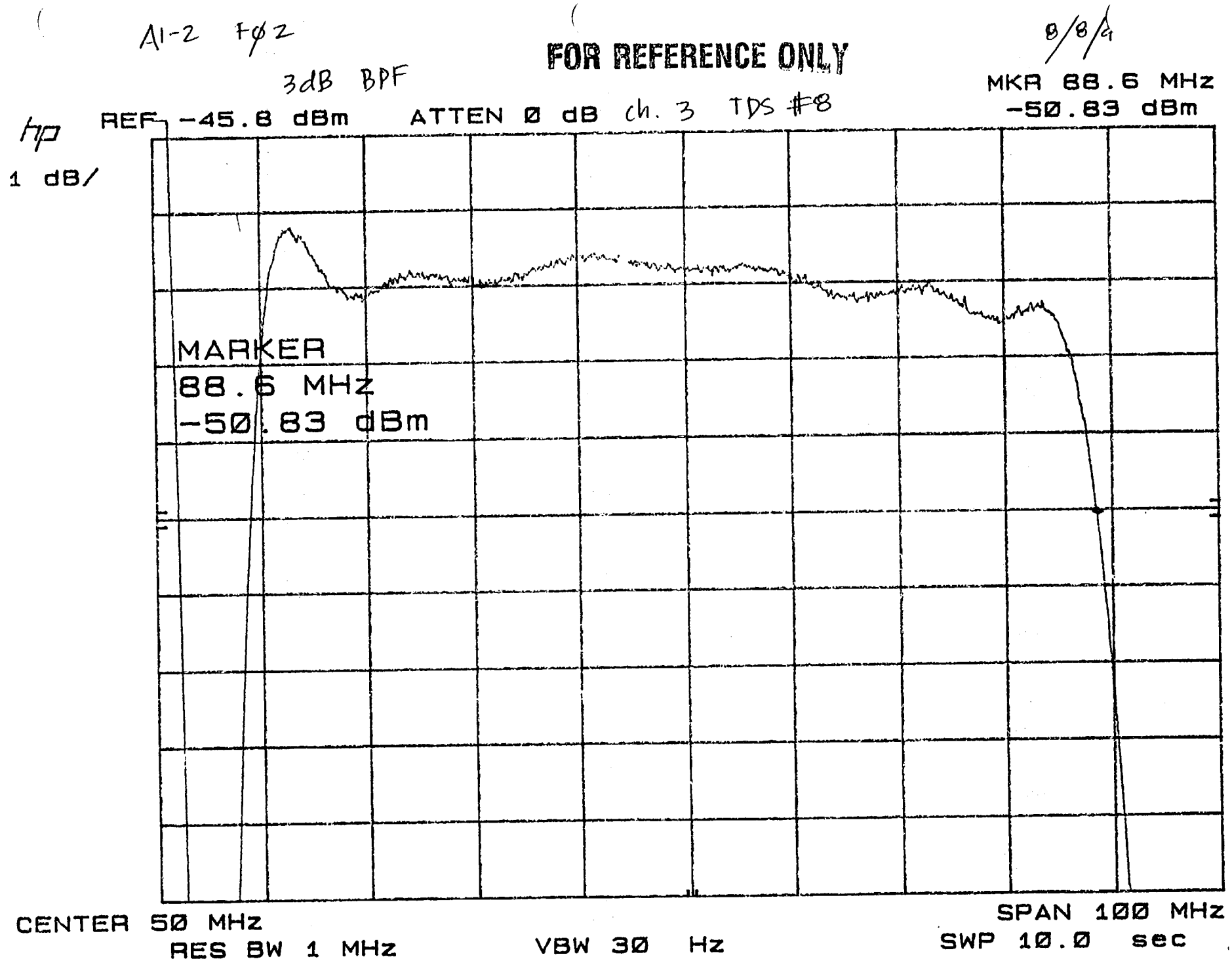
Date:_____

A1-2 Fø2

3dB BPF

FOR REFERENCE ONLY

8/8/4

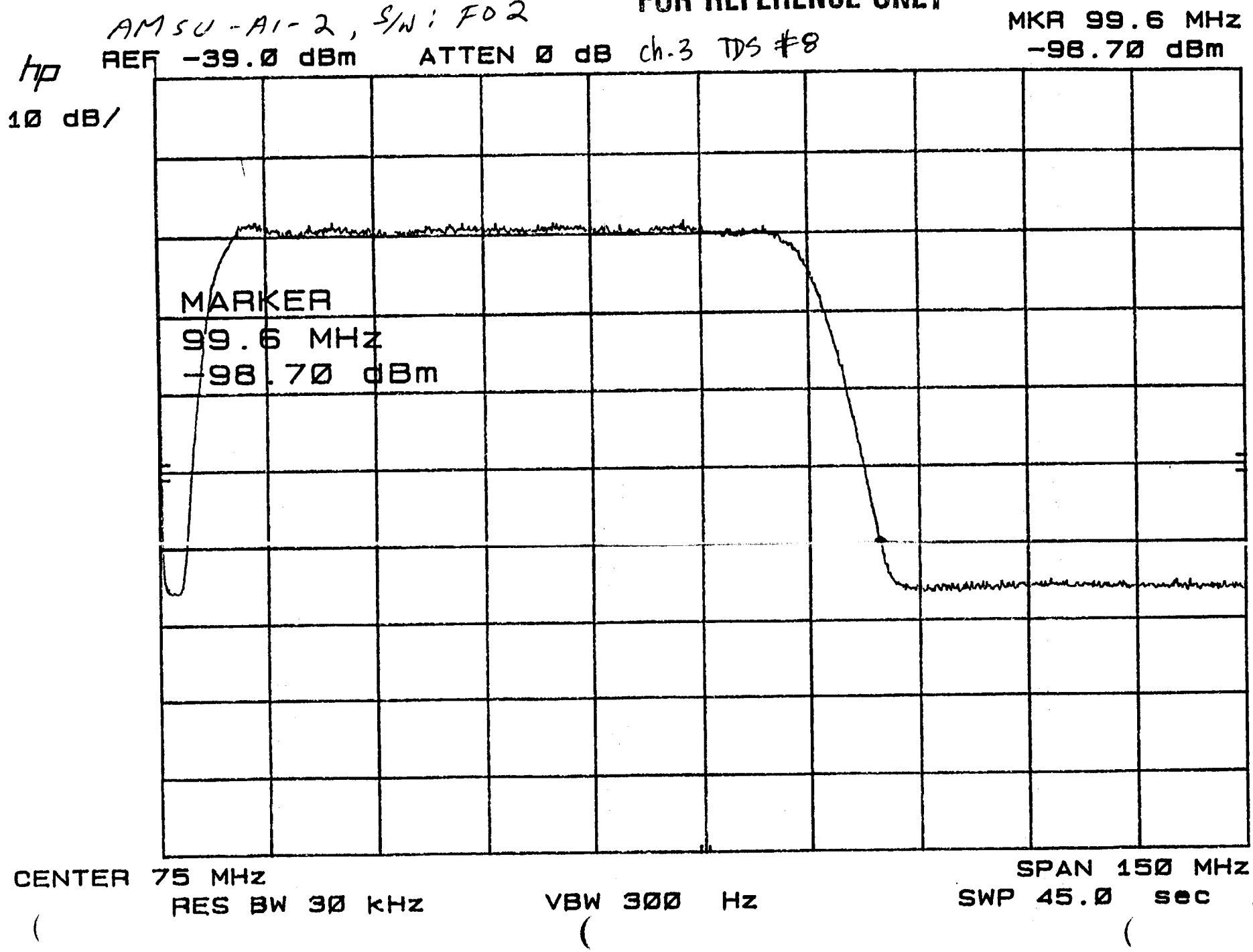


40dB BPF

AMSU-A1-2, S/N: F02

8/8/98

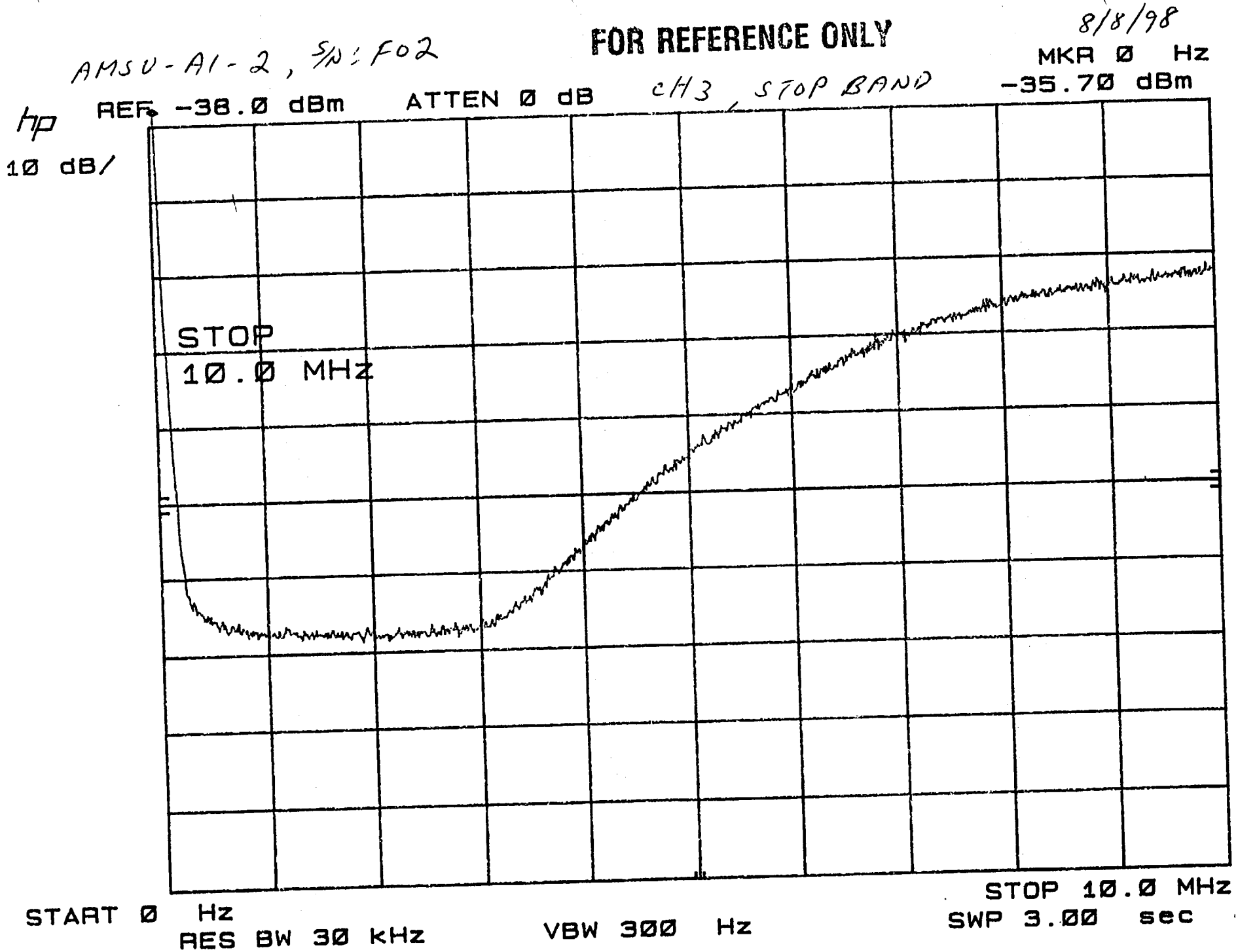
FOR REFERENCE ONLY



AMSU-A1-2, S/N: F02

FOR REFERENCE ONLY

8/8/98

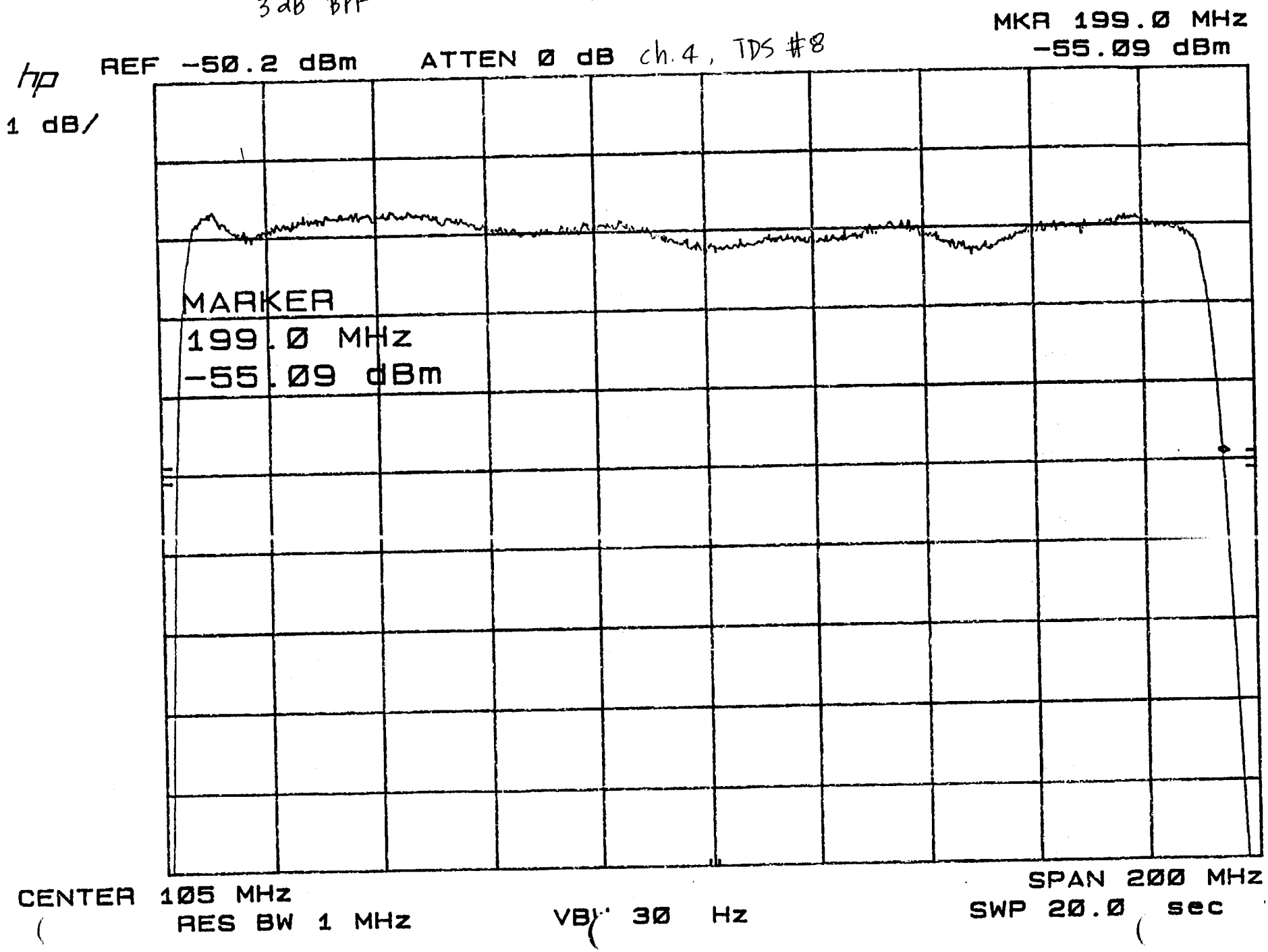


A1-2 F#2

3 dB BPF

FOR REFERENCE ONLY

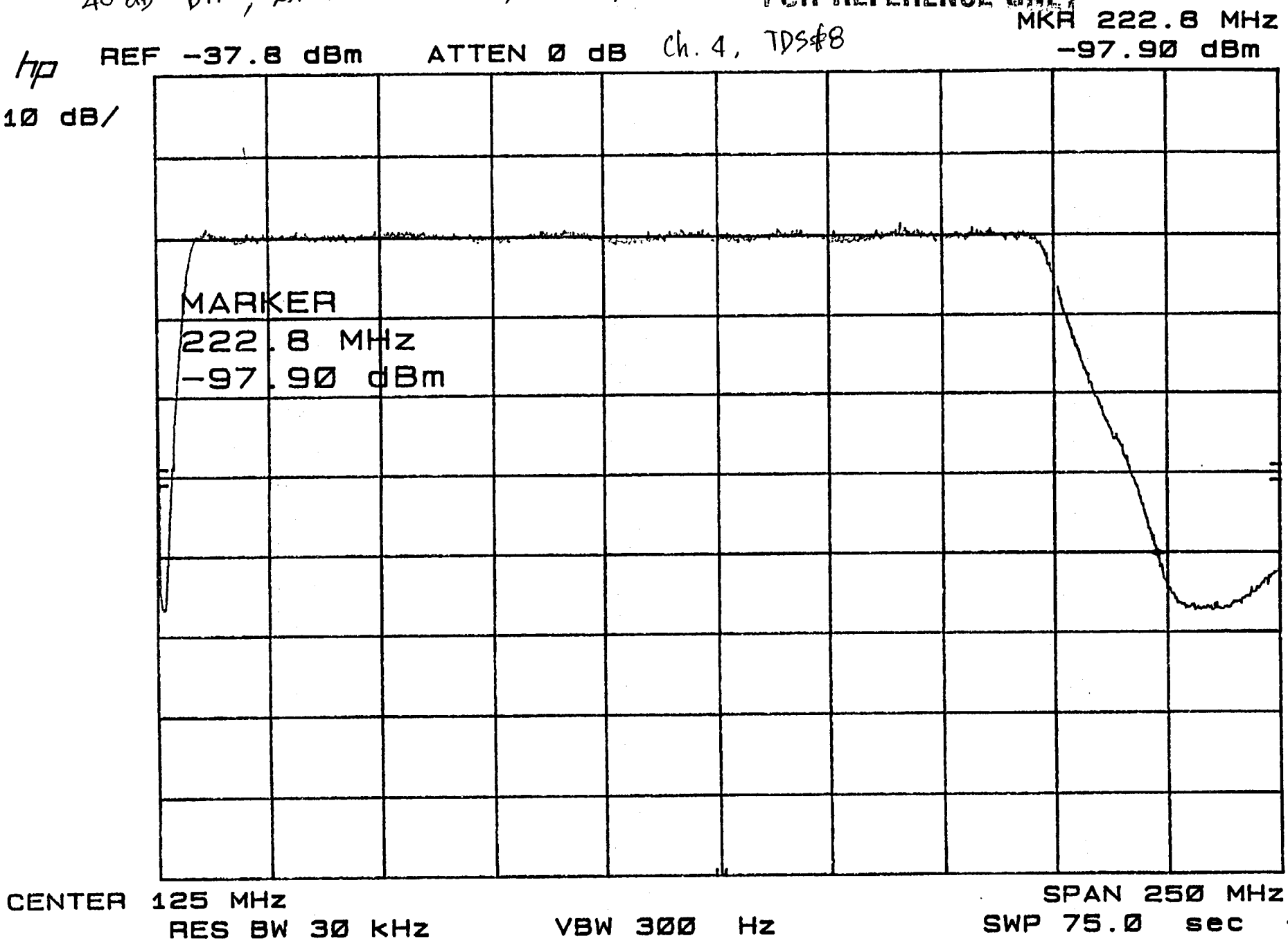
8/8/98



8/1, 18

40 dB BPF, AMSU-A1-2, S/N: F02

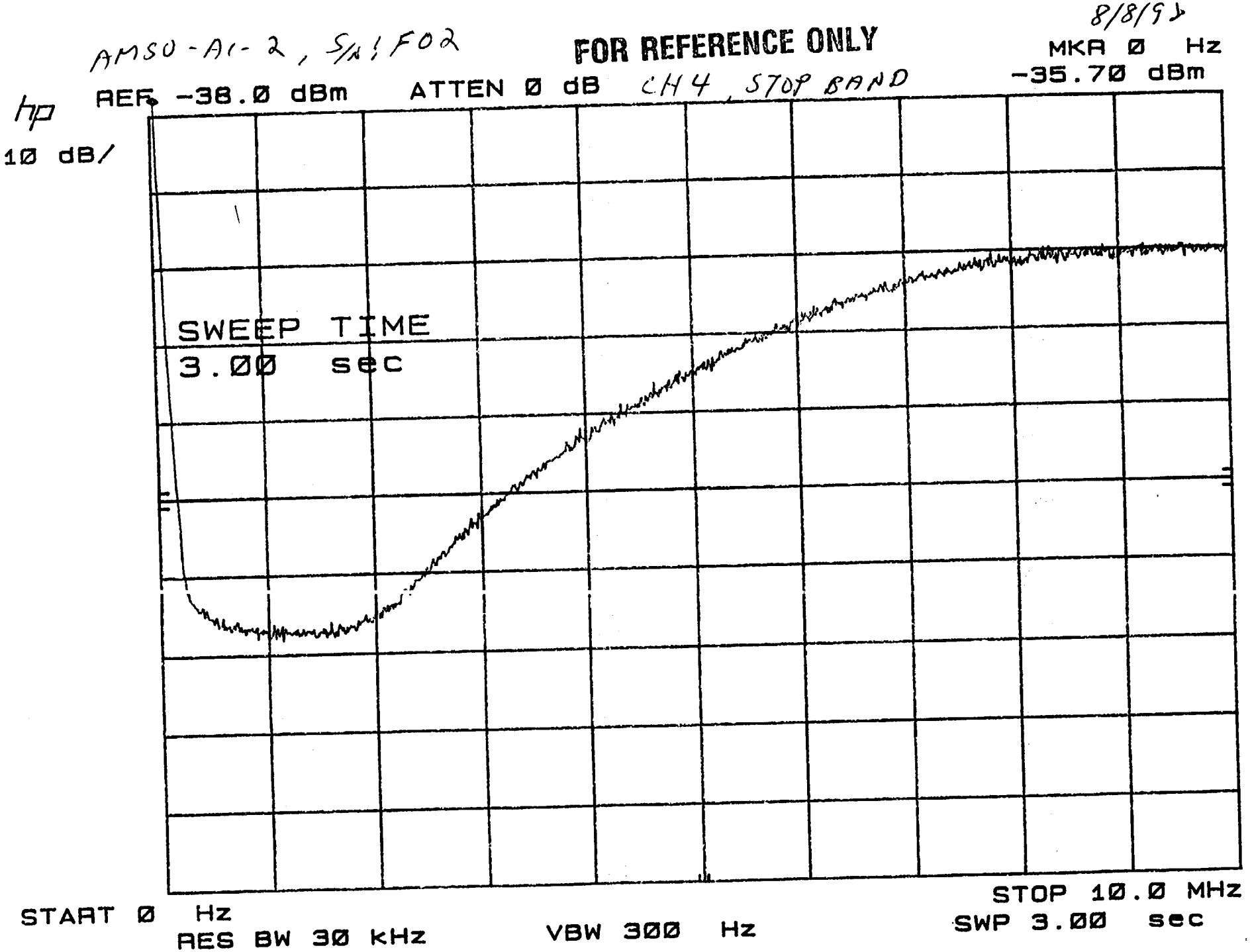
FOR REFERENCE ONLY



AMSO-A1-2, S/N 1F02

FOR REFERENCE ONLY

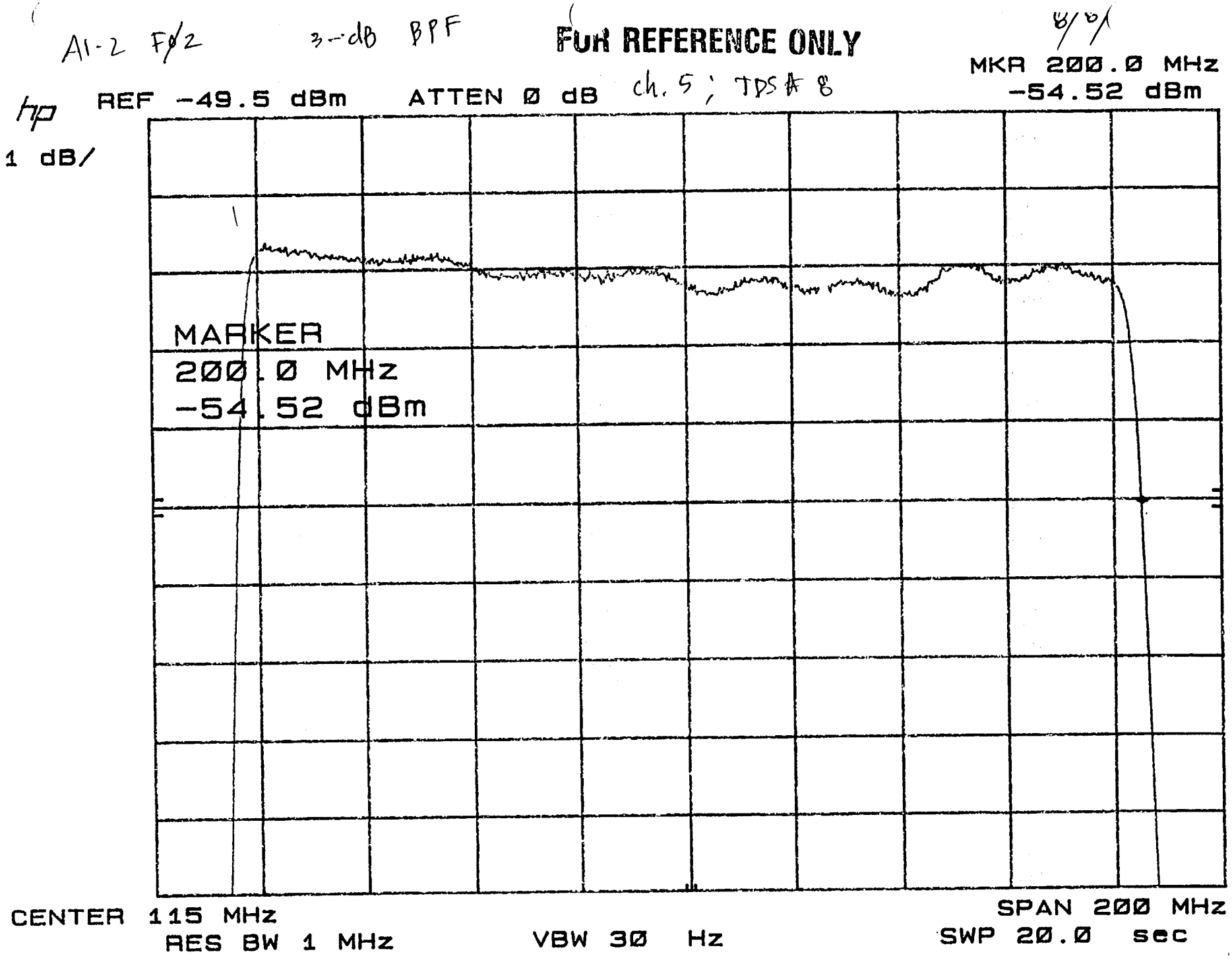
8/8/94



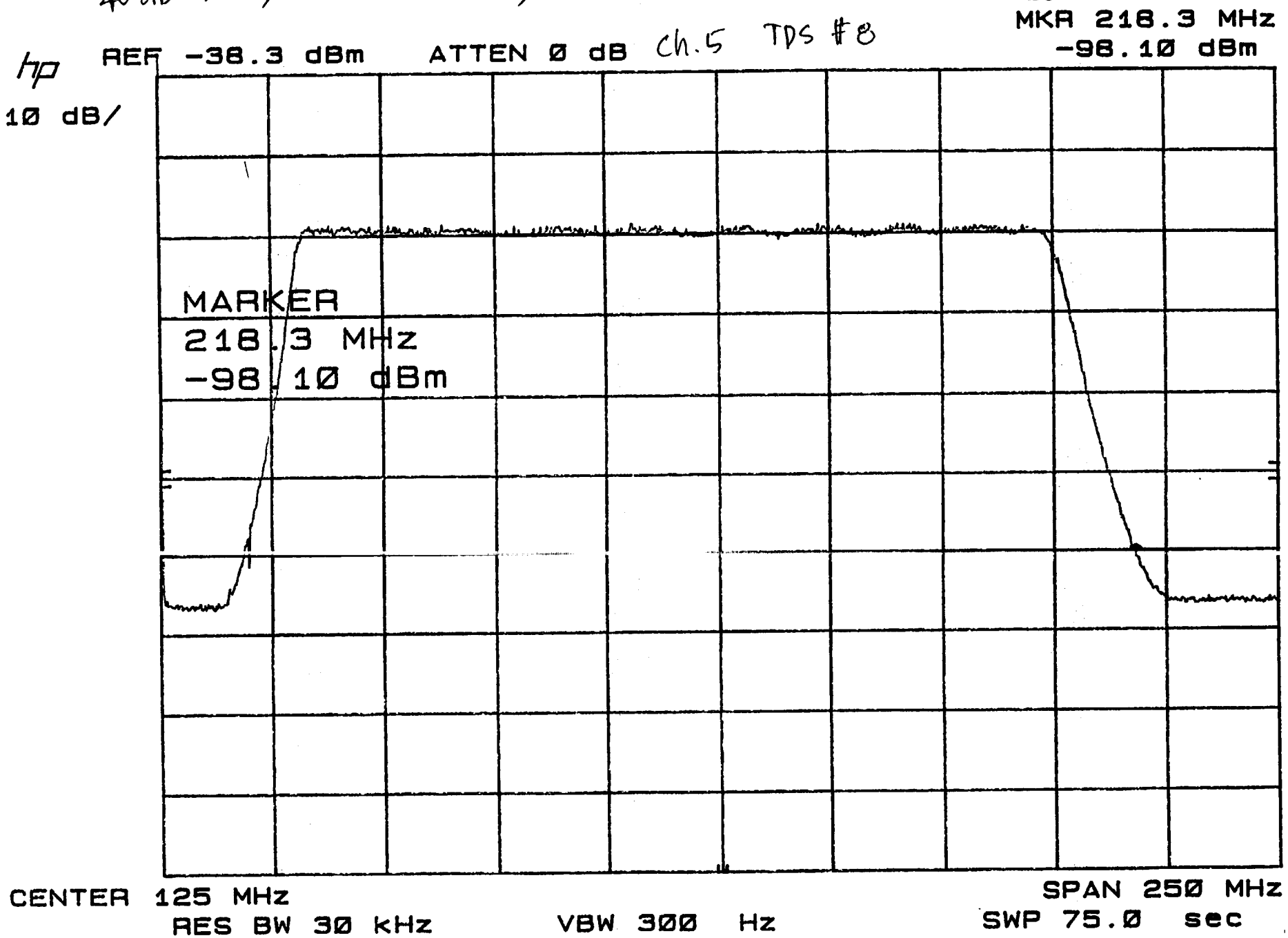
A1-2 F#2 3-dB BPF

FOR REFERENCE ONLY

8/01



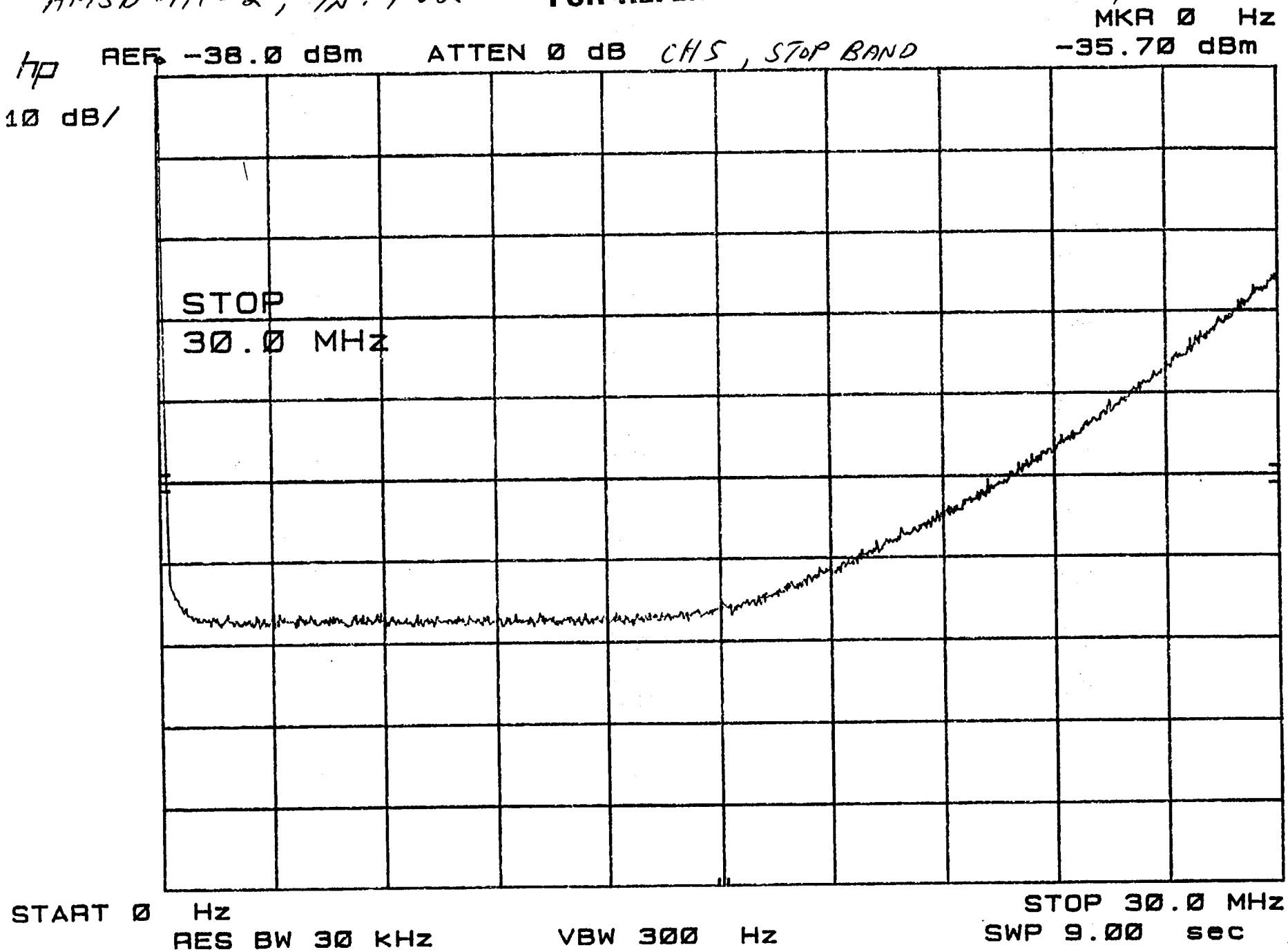
40 dB BPF, AMSU-A1-2, S/N: F02 **FOR REFERENCE ONLY** 8/8/98



AMSU-A1-2, S/N: F02

FOR REFERENCE ONLY

8/8/98

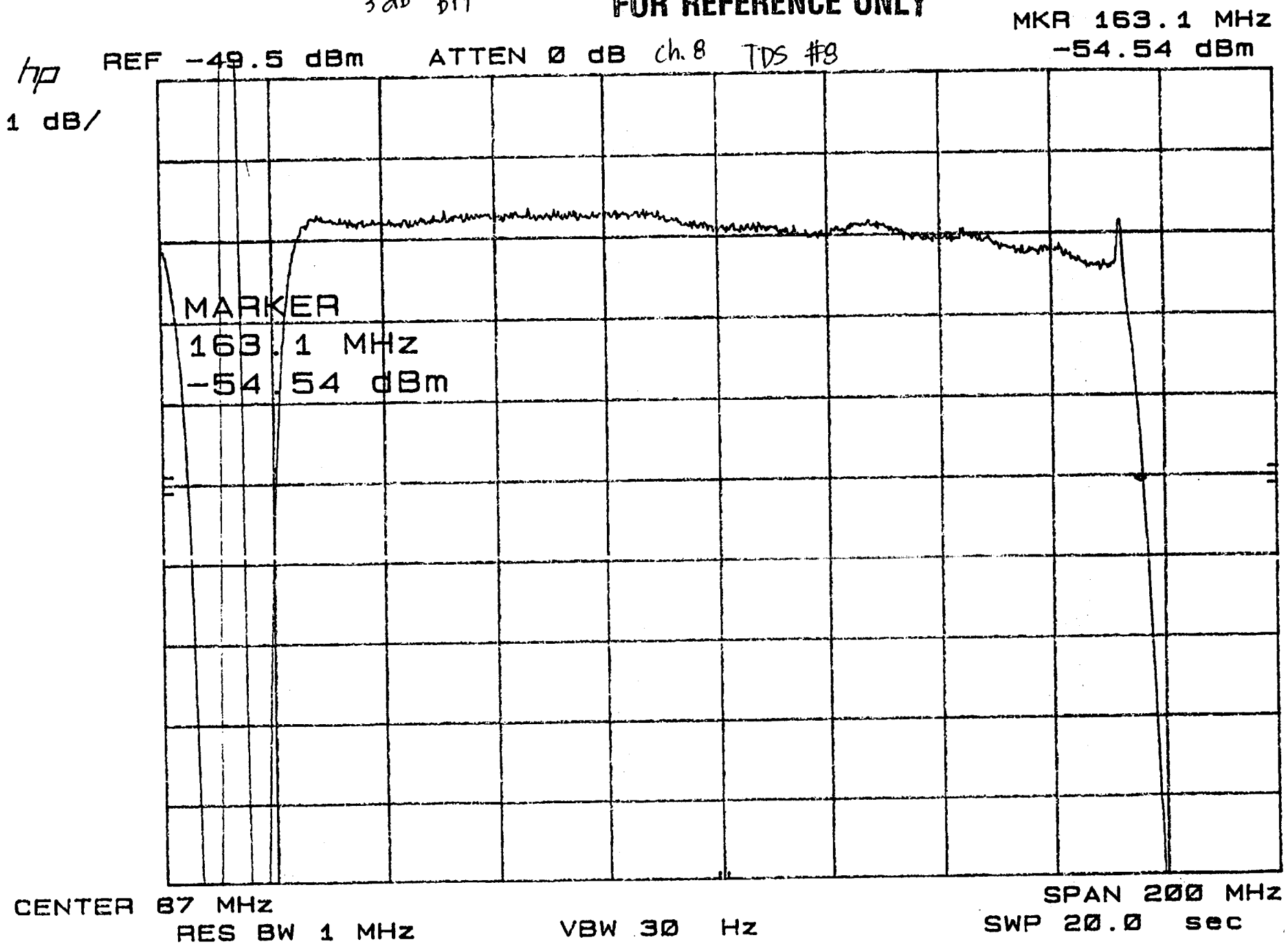


A1-2 F@2

3dB BPF

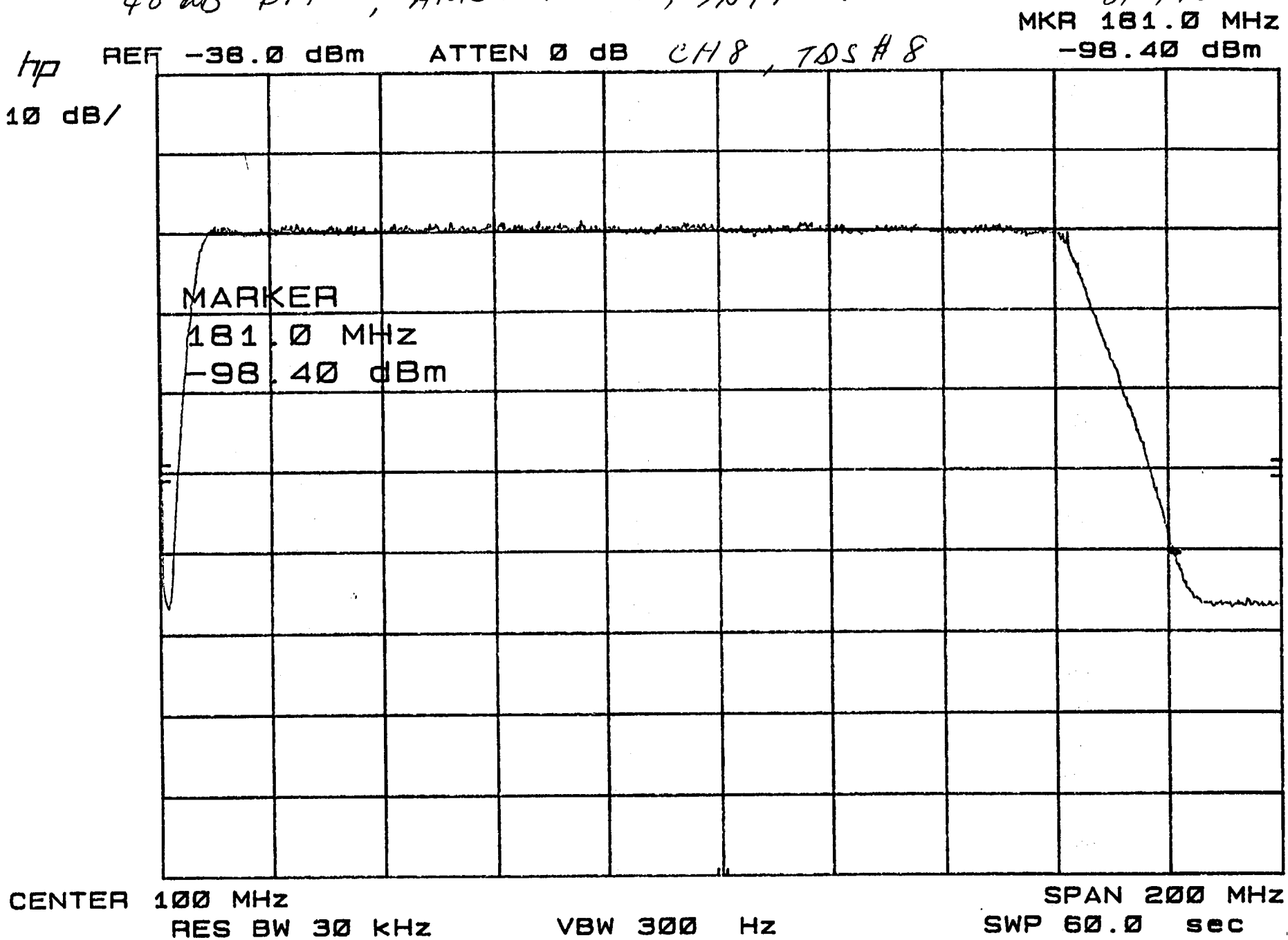
FOR REFERENCE ONLY

8/8/98



FOR REFERENCE ONLY

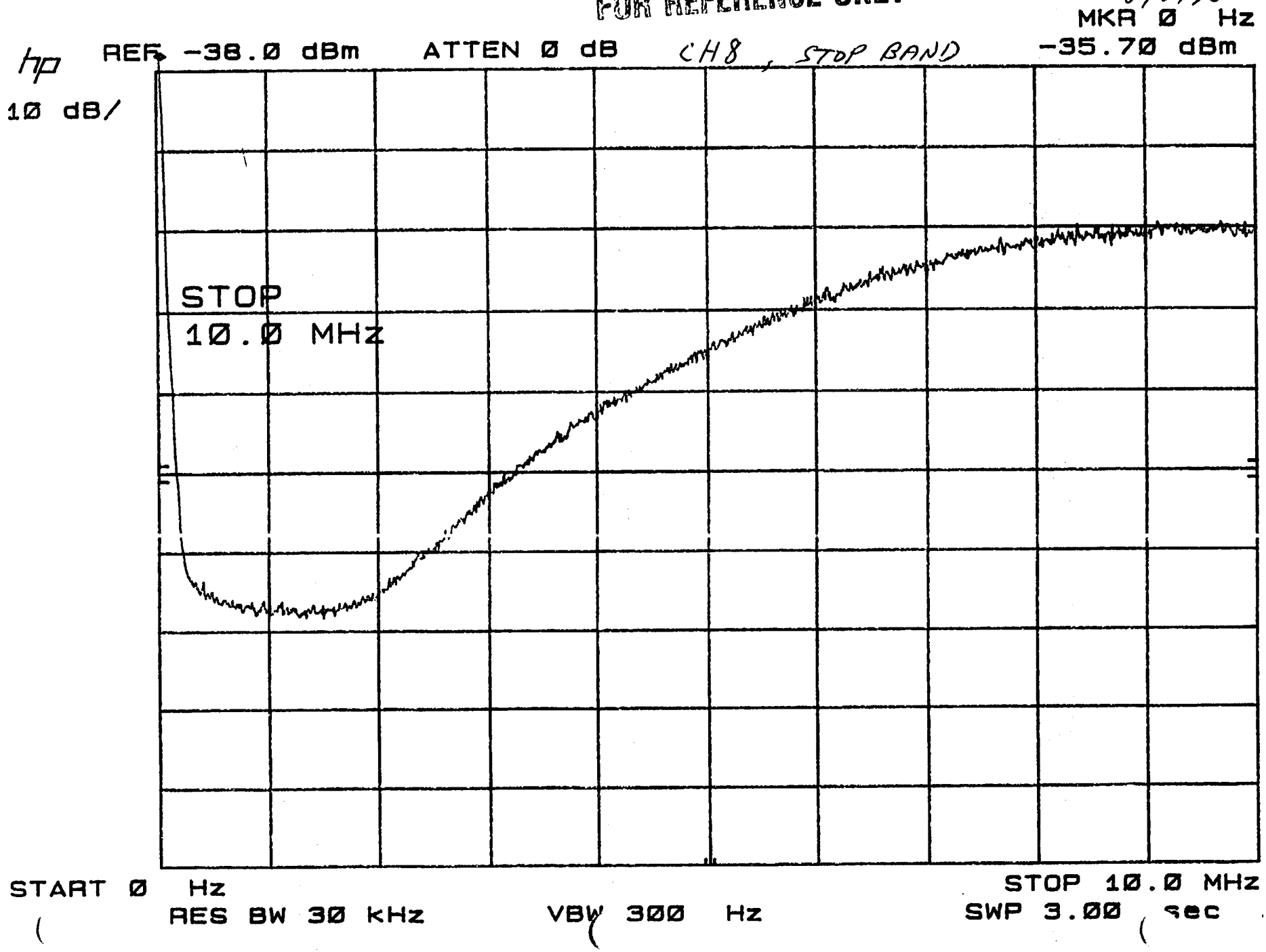
40 dB BPF , AMSU-A1-2 , S/N: F02 8/8/98



AMSU-A1-2, S/N: F02

FOR REFERENCE ONLY

8/8/98



TEST DATA SHEET 11 (Sheet 1 of 8)
Noise Figure and Noise Power Stability Test Data (Paragraph 3.5.4) (A1-2)

Test Setup Verified: _____ Signature Baseplate Temperature (T_B) 26.9 °C

Component	Channel No.	V_b(V)	I_b(mA)	T_H(°C)	V_H (V) Mean	V_H (V) Standard Deviation	T_C(°C)	V_C (V) Mean	V_C (V) Standard Deviation
LO	3	9.98	178.3	22.3	-.97112	.00026	-194.0	-.70169	.00024
				22.3	-.97152	.00026	-194.0	-.70206	.00048
				22.3	-.97177	.00029	-194.0	-.70028	.00030
				22.3	-.97186	.00029	-194.0	-.69874	.00035
				22.3	-.97178	.00025	-194.0	-.70067	.00036
				22.3	-.97191	.00026	-194.0	-.69649	.00022
				22.3	-.97201	.00028	-194.0	-.69627	.00030
				22.3	-.97200	.00041	-194.0	-.69743	.00021
				22.3	-.97181	.00025	-194.0	-.69769	.00032
				22.3	-.97194	.00025	-194.0	-.69585	.00038
Mixer/ Amps	All	10.02	174.8						
IF Amps	All	N/A	N/A						

Part No.: 1356409-1

Serial No.: F02

Test Engineer: _____

Quality Assurance: _____ 8/18/98 (TA 228)

Date: 8/10/98

TEST DATA SHEET 11 (Sheet 2 of 8)

Noise Figure and Noise Power Stability Test Data (Paragraph 3.5.4) (A1-2)

Test Setup Verified: J. Thuong (Signature) Baseplate Temperature (T_B) 26.9 °C

Component	Channel No.	V_b(V)	I_b(mA)	T_H(°C)	V_H (V) Mean	V_H (V) Standard Deviation	T_C(°C)	V_C (V) Mean	V_C (V) Standard Deviation
LO	4	10.02	176.6	22.3	-.92078	.00018	-194.0	-.64071	.00052
				22.3	-.92034	.00019	-194.0	-.64297	.00035
				22.3	-.92027	.00020	-194.0	-.64340	.00045
				22.3	-.92005	.00015	-194.0	-.64453	.00031
				22.3	-.91981	.00016	-194.0	-.64449	.00042
				22.3	-.91980	.00018	-194.0	-.64430	.00039
				22.3	-.91986	.00019	-194.0	-.64606	.00040
				22.3	-.91971	.00017	-194.0	-.64672	.00037
				22.3	-.91979	.00016	-194.0	-.64750	.00027
				22.3	-.91969	.00015	-194.0	-.64669	.00032
Mixer/ Amps	All	10.02	174.8						
IF Amps	All	N/A	N/A						

Part No.: 1356409-1

Serial No.: F02

Test Engineer: [signature]

Quality Assurance: [signature] 8/18/98

Date: 8/10/98

TEST DATA SHEET 11 (Sheet 5 of 8)
Noise Figure and Noise Power Stability Test Data (Paragraph 3.5.4) (A1-2)

Test Setup Verified: J. Zuniga (Signature) Baseplate Temperature (T_B) 26.9 °C

Channel No.	NF (dB)				NPS (K)				
	Required (Max)	Measured	Average	Pass/Fail	Required (Max)	Measured	Average	Delta	Pass/Fail
3		4.26				0.05			
		4.27				0.03			
		4.23				0.09			
		4.21				0.09			
		4.24				0.08			
		4.17				0.03			
		4.17				0.07			
		4.19				0.24			
		4.19				0.08			
		4.16				0.07			
	5.1		4.21	P	0.12	X	0.08	0.213	P

Pass = P, Fail = F

Part No.: 1356409-1

Serial No.: F02

Test Engineer: [signature]

Quality Assurance: [signature] 8/18/98

Date: 8/10/98

TEST DATA SHEET 11 (Sheet 6 of 8)

Noise Figure and Noise Power Stability Test Data (Paragraph 3.5.4) (A1-2)

Test Setup Verified: J. Zhang (Signature) Baseplate Temperature (T_B) 26.9 °C

Channel No.	NF (dB) Required (Max)	NF (dB) Measured	NF (dB) Average	NF (dB) Pass/Fail	NPS (K) Required (Max)	NPS (K) Measured	NPS (K) Average	NPS (K) Delta	NPS (K) Pass/Fail
4		3.86				0.06			
		3.90				0.07			
		3.91				0.08			
		3.93				0.05			
		3.93				0.01			
		3.93				0.06			
		3.96				0.08			
		3.97				0.04			
		3.98				0.03			
		3.97				0.06			
	4.95		3.93	P	0.08		0.05	0.073	P

Pass = P, Fail = F

Part No.: 356409-1

Serial No.: F02

Test Engineer: [signature]

Quality Assurance: [signature] 8/10/98

Date: 8/10/98

FOR REFERENCE ONLY

AMSU-A TEST

AMSU-A1-2, CH3, S/N: F02, NF & NPS TEST DATA, 8/10/98

SEQ	TEMP_TEST	TEST TEMP	VOLTAGE	STD_DEV	NF (dB)	NPS(K)
1	WARM TEST	295.45	-.97111654	.00026109	----------	---------
2	COLD TEST	79.15	-.70169356	.00024472	4.26448678	.04720776
3	WARM TEST	295.45	-.97152481	.00026428	----------	---------
4	COLD TEST	79.15	-.70205811	.00047635	4.26561541	.03443984
5	WARM TEST	295.45	-.97177036	.00029178	----------	---------
6	COLD TEST	79.15	-.70027524	.00030214	4.23392140	.09228622
7	WARM TEST	295.45	-.97185814	.00029181	----------	---------
8	COLD TEST	79.15	-.69873572	.00035074	4.20817876	.09174605
9	WARM TEST	295.45	-.97177725	.00024973	----------	---------
10	COLD TEST	79.15	-.70066861	.00035543	4.24018296	.07717603
11	WARM TEST	295.45	-.97191213	.00026476	----------	---------
12	COLD TEST	79.15	-.69649315	.00021519	4.17179607	.03183776
13	WARM TEST	295.45	-.97200892	.00028214	----------	---------
14	COLD TEST	79.15	-.69626593	.00030425	4.16708876	.06949106
15	WARM TEST	295.45	-.97200068	.00041013	----------	---------
16	COLD TEST	79.15	-.69743054	.00020655	4.18569646	.24465906
17	WARM TEST	295.45	-.97181455	.00024521	----------	---------
18	COLD TEST	79.15	-.69769468	.00032062	4.19203775	.08498842
19	WARM TEST	295.45	-.97194254	.00025046	----------	---------
20	COLD TEST	79.15	-.69585279	.00038153	4.16129280	.07438111

CH. 3 ,79.8 MHz MHz

NOISE FIGURE AVERAGE (dB) = 4.20919246831

NOISE POWER STABILITY (K) = .0848213311897

NOISE POWER STABILITY DELTA (K) = .212821303025

NPS_MAX (K) = .244659059831 NPS_MIN (K) = .0318377568061

INTEGRATION TIME = .165

TEST DATA SHEET 11 (Sheet 2 of 8)

Noise Figure and Noise Power Stability Test Data (Paragraph 3.5.4) (A1-2)

Test Setup Verified: _____ Signature Baseplate Temperature (T_B) 26.9 °C

Compo-nent	Channel No.	V_b(V)	I_b(mA)	T_H(°C)	V_H (V)		T_C(°C)	V_C (V)	
					Mean	Standard Deviation		Mean	Standard Deviation
LO	4	10.02	176.6	22.3	-.92078	.00018	-194.0	-.64071	.00052
				22.3	-.92034	.00019	-194.0	-.64297	.00035
				22.3	-.92027	.00020	-194.0	-.64340	.00045
				22.3	-.92005	.00015	-194.0	-.64453	.00031
				22.3	-.91981	.00016	-194.0	-.64449	.00042
				22.3	-.91980	.00018	-194.0	-.64430	.00039
				22.3	-.91986	.00019	-194.0	-.64606	.00040
				22.3	-.91971	.00017	-194.0	-.64672	.00037
				22.3	-.91979	.00016	-194.0	-.64750	.00027
				22.3	-.91969	.00015	-194.0	-.64669	.00032
Mixer/ Amps	All	10.02	174.8						
IF Amps	All	N/A	N/A						

art No.: 1356409-1

erial No.: F02

Test Engineer: _____

Quality Assurance: _____ 8/18/98

Date: 8/10/98

TEST DATA SHEET 11 (Sheet 7 of 8)
Noise Figure and Noise Power Stability Test Data (Paragraph 3.5.4) (A1-2)

Test Setup Verified: T. Zuniga (Signature) Baseplate Temperature (T_B) 26.9 °C

Channel No.	NF (dB)				NPS (K)				
	Required (Max)	Measured	Average	Pass/Fail	Required (Max)	Measured	Average	Delta	Pass/Fail
5		4.15				0.08			
		4.07				0.02			
		4.11				0.09			
		4.15				0.03			
		4.18				0.07			
		4.18				0.04			
		4.17				0.04			
		4.17				0.11			
		4.18				0.16			
		4.14				0.05			
	5.1		4.15	P	0.08	X	0.07	0.141	P

Pass = P, Fail = F

Part No.: 1356409-1

Serial No.: F02

Test Engineer: T. Zuniga

Quality Assurance: 228 R. Mayo 8/18/98

Date: 8/10/98

TEST DATA SHEET 11 (Sheet 8 of 8)

Noise Figure and Noise Power Stability Test Data (Paragraph 3.5.4) (A1-2)

Test Setup Verified: _____ Signature Baseplate Temperature (T_B) 26.8 °C

Channel No.	NF (dB)				NPS (K)				
	Required (Max)	Measured	Average	Pass/Fail	Required (Max)	Measured	Average	Delta	Pass/Fail
8		4.28				0.07			
		4.20				0.04			
		4.19				0.05			
		4.24				0.08			
		4.27				0.05			
		4.27				0.05			
		4.30				0.05			
		4.29				0.11			
		4.30				0.09			
		4.31				0.08			
	5.0		4.27	P	0.08	0.07	0.07	0.067	P

Pass = P, Fail = F

Part No.: 1356409-1

Serial No.: F02

Test Engineer: _____

Quality Assurance: _____ 8/10/98

Date: 8/10/98

FOR REFERENCE ONLY

AMSU-A TEST

AMSU-A1-2, CH4, S/N: F02, NF & NPS TEST DATA, 8/10/98

SEQ	TEMP_TEST	TEST TEMP	VOLTAGE	STD_DEV	NF (dB)	NPS(K)
1	WARM TEST	295.45	-.92078072	.00018365	----------	---------
2	COLD TEST	79.15	-.64070843	.00051561	3.86203352	.06393283
3	WARM TEST	295.45	-.92034408	.00018863	----------	---------
4	COLD TEST	79.15	-.64296503	.00034905	3.90224534	.07287334
5	WARM TEST	295.45	-.92026647	.00019537	----------	---------
6	COLD TEST	79.15	-.64340328	.00045077	3.91002231	.08314186
7	WARM TEST	295.45	-.92004713	.00015336	----------	---------
8	COLD TEST	79.15	-.64453484	.00031292	3.93038346	.04518335
9	WARM TEST	295.45	-.91980972	.00016422	----------	---------
10	COLD TEST	79.15	-.64448795	.00042470	3.93228128	.00966302
11	WARM TEST	295.45	-.91980015	.00017887	----------	---------
12	COLD TEST	79.15	-.64430074	.00039259	3.92941326	.05648454
13	WARM TEST	295.45	-.91985704	.00019342	----------	---------
14	COLD TEST	79.15	-.64605564	.00039542	3.95673755	.08129484
15	WARM TEST	295.45	-.91971113	.00017328	----------	---------
16	COLD TEST	79.15	-.64672478	.00037365	3.96908839	.04491082
17	WARM TEST	295.45	-.91979391	.00015795	----------	---------
18	COLD TEST	79.15	-.64750378	.00028602	3.98065594	.03434326
19	WARM TEST	295.45	-.91969085	.00014758	----------	---------
20	COLD TEST	79.15	-.64669891	.00032398	3.96890232	.05619716

CH. 4 ,191.2 MHz MHz

NOISE FIGURE AVERAGE (dB) = 3.93431362693

NOISE POWER STABILITY (K) = .0548025024402

NOISE POWER STABILITY DELTA (K) = .0734788397365

NPS_MAX (K) = .0831418603151 NPS_MIN (K) = .00966302057856

INTEGRATION TIME = .165

TEST DATA SHEET 11 (Sheet 3 of 8)
Noise Figure and Noise Power Stability Test Data (Paragraph 3.5.4) (A1-2)

Test Setup Verified: T. Tsung (Signature) Baseplate Temperature (T_B) 26.9 °C

Component	Channel No.	V_b(V)	I_b(mA)	T_H(°C)	V_H (V) Mean	V_H (V) Standard Deviation	T_C(°C)	V_C (V) Mean	V_C (V) Standard Deviation
LO	5	10.00	183.3	22.3	-.96252	.00021	-194.0	-.68861	.00046
				22.3	-.96076	.00018	-194.0	-.68218	.00031
				22.3	-.96082	.00021	-194.0	-.68495	.00046
				22.3	-.96090	.00018	-194.0	-.68705	.00044
				22.3	-.96106	.00020	-194.0	-.68893	.00043
				22.3	-.96147	.00019	-194.0	-.68945	.00035
				22.3	-.96172	.00017	-194.0	-.68878	.00041
				22.3	-.96199	.00023	-194.0	-.68912	.00042
				22.3	-.96201	.00027	-194.0	-.69012	.00044
				22.3	-.96230	.00017	-194.0	-.68774	.00038
Mixer/ Amps	All	10.02	174.8						
IF Amps	All	N/A	N/A						

Part No.: 1356409-1
Serial No.: F02

Test Engineer:
Quality Assurance: (7A 228) 8/18/98
Date: 8/10/98

TEST DATA SHEET 11 (Sheet 4 of 8)
Noise Figure and Noise Power Stability Test Data (Paragraph 3.5.4) (A1-2)

Test Setup Verified: _____ Signature

Baseplate Temperature (T_B) 26.8 °C

Compo-nent	Channel No.	V_b(V)	I_b(mA)	T_H(°C)	V_H (V) Mean	V_H (V) Standard Deviation	T_C(°C)	V_C (V) Mean	V_C (V) Standard Deviation
LO	8	9.98	190.2	22.3	-.90982	.00020	-194.0	-.65853	.00041
				22.3	-.90923	.00019	-194.0	-.65311	.00027
				22.3	-.90895	.00019	-194.0	-.65252	.00047
				22.3	-.90867	.00020	-194.0	-.65525	.00047
				22.3	-.90874	.00019	-194.0	-.65681	.00026
				22.3	-.90869	.00019	-194.0	-.65706	.00047
				22.3	-.90886	.00019	-194.0	-.65884	.00034
				22.3	-.90923	.00022	-194.0	-.65831	.00027
				22.3	-.90877	.00021	-194.0	-.65863	.00024
				22.3	-.90891	.00020	-194.0	-.65907	.00028
Mixer/ Amps	All								
IF Amps	All	N/A	N/A						

Part No.: 1356409-1

Serial No.: F02

Test Engineer: _____

Quality Assurance: _____ 8/10/98

Date: 8/10/98

TEST DATA SHEET 11 (Sheet 6 of 8)

Noise Figure and Noise Power Stability Test Data (Paragraph 3.5.4) (A1-2)

Test Setup Verified: J. Zhang (Signature) Baseplate Temperature (T_B) 26.9 °C

Channel No.	NF (dB)				NPS (K)				
	Required (Max)	Measured	Average	Pass/Fail	Required (Max)	Measured	Average	Delta	Pass/Fail
4		3.86				0.06			
		3.90				0.07			
		3.91				0.08			
		3.93				0.05			
		3.93				0.01			
		3.93				0.06			
		3.96				0.08			
		3.97				0.04			
		3.98				0.03			
		3.97				0.06			
	4.95		3.93	P	0.08	X	0.05	0.073	P

Pass = P, Fail = F

Part No.: 1356409-1

Serial No.: F02

Test Engineer: J. Zhang

Quality Assurance: [signature] 8/10/98 (228)

Date: 8/10/98

FOR REFERENCE ONLY

AMSU-A TEST

AMSU-A1-2, CH5, S/N: F02, NF & NPS TEST DATA, 8/10/98

SEQ	TEMP_TEST	TEST TEMP	VOLTAGE	STD_DEV	NF (dB)	NPS(K)
1	WARM TEST	295.45	-.96252123	.00020894	----------	---------
2	COLD TEST	79.15	-.68860875	.00046132	4.15331754	.08080427
3	WARM TEST	295.45	-.96076359	.00017969	----------	---------
4	COLD TEST	79.15	-.68217045	.00030601	4.07119925	.02159219
5	WARM TEST	295.45	-.96081546	.00021397	----------	---------
6	COLD TEST	79.15	-.68494778	.00046048	4.11444409	.08842335
7	WARM TEST	295.45	-.96089981	.00017719	----------	---------
8	COLD TEST	79.15	-.68705407	.00044366	4.14700835	.03232538
9	WARM TEST	295.45	-.96106207	.00020035	----------	---------
10	COLD TEST	79.15	-.68893071	.00042995	4.17521752	.06677034
11	WARM TEST	295.45	-.96146729	.00018860	----------	---------
12	COLD TEST	79.15	-.68944535	.00034964	4.17882065	.03941713
13	WARM TEST	295.45	-.96171784	.00017413	----------	---------
14	COLD TEST	79.15	-.68877662	.00041208	4.16520305	.04200507
15	WARM TEST	295.45	-.96198605	.00022924	----------	---------
16	COLD TEST	79.15	-.68911623	.00042061	4.16756723	.11042184
17	WARM TEST	295.45	-.96201187	.00027370	----------	---------
18	COLD TEST	79.15	-.69012460	.00044143	4.18346357	.16257786
19	WARM TEST	295.45	-.96229618	.00016991	----------	---------
20	COLD TEST	79.15	-.68773967	.00038087	4.14202155	.05165870

CH. 5 ,169.2 MHz MHz

NOISE FIGURE AVERAGE (dB) = 4.14994888319

NOISE POWER STABILITY (K) = .0695996124927

NOISE POWER STABILITY DELTA (K) = .140985672202

NPS_MAX (K) = .162577860597 NPS_MIN (K) = .0215921883049

INTEGRATION TIME = .165

TEST DATA SHEET 11 (Sheet 4 of 8)

Noise Figure and Noise Power Stability Test Data (Paragraph 3.5.4) (A1-2)

Test Setup Verified: [signature] Signature

Baseplate Temperature (T_B) 26.8 °C

Compo-nent	Channel No.	V_b(V)	I_b(mA)	T_H(°C)	V_H (V)		T_C(°C)	V_C (V)	
					Mean	Standard Deviation		Mean	Standard Deviation
LO	8	9.98	190.2	22.3	-.90982	.00020	-194.0	-.65853	.00041
				22.3	-.90923	.00019	-194.0	-.65311	.00027
				22.3	-.90895	.00019	-194.0	-.65252	.00047
				22.3	-.90867	.00020	-194.0	-.65525	.00047
				22.3	-.90874	.00019	-194.0	-.65681	.00026
				22.3	-.90869	.00019	-194.0	-.65706	.00047
				22.3	-.90886	.00019	-194.0	-.65884	.00034
				22.3	-.90923	.00022	-194.0	-.65831	.00027
				22.3	-.90877	.00021	-194.0	-.65863	.00024
				22.3	-.90891	.00020	-194.0	-.65907	.00028
Mixer/ Amps	All								
IF Amps	All	N/A	N/A						

Part No.: 1356409-1

Serial No.: F02

Test Engineer: [signature]

Quality Assurance: [signature] 8/10/98 (228)

Date: 8/10/98

TEST DATA SHEET 11 (Sheet 8 of 8)

Noise Figure and Noise Power Stability Test Data (Paragraph 3.5.4) (A1-2)

Test Setup Verified: J. Jones Signature Baseplate Temperature (T_B) 26.8 °C

Channel No.	NF (dB) Required (Max)	NF (dB) Measured	NF (dB) Average	NF (dB) Pass/Fail	NPS (K) Required (Max)	NPS (K) Measured	NPS (K) Average	NPS (K) Delta	NPS (K) Pass/Fail
8		4.28				0.07			
		4.20				0.04			
		4.19				0.05			
		4.24				0.08			
		4.27				0.05			
		4.27				0.05			
		4.30				0.05			
		4.29				0.11			
		4.30				0.09			
		4.31				0.08			
	5.0		4.27	P	0.08	~~0.07~~ 0.07	0.07	0.067	P

Pass = P, Fail = F

Part No.: 1356409-1

Serial No.: F02

Test Engineer: J. Jones

Quality Assurance: R. Myers 8/10/98 (228 TA)

Date: 8/10/98

FOR REFERENCE ONLY

AMSU-A TEST

AMSU-A1-2, CH8, S/N: F02, NF & NPS TEST DATA, 8/10/98

SEQ	TEMP_TEST	TEST TEMP	VOLTAGE	STD_DEV	NF (dB)	NPS(K)
1	WARM TEST	295.45	-.90982071	.00019903	----------	---------
2	COLD TEST	79.15	-.65853219	.00041291	4.28408805	.07349365
3	WARM TEST	295.45	-.90923330	.00018612	----------	---------
4	COLD TEST	79.15	-.65310785	.00027432	4.19787642	.04101958
5	WARM TEST	295.45	-.90895001	.00018875	----------	---------
6	COLD TEST	79.15	-.65252352	.00046683	4.19137526	.04891251
7	WARM TEST	295.45	-.90867214	.00020305	----------	---------
8	COLD TEST	79.15	-.65525333	.00047189	4.24164307	.08090871
9	WARM TEST	295.45	-.90874255	.00018955	----------	---------
10	COLD TEST	79.15	-.65681301	.00025992	4.26776025	.05207986
11	WARM TEST	295.45	-.90869436	.00018894	----------	---------
12	COLD TEST	79.15	-.65705911	.00047443	4.27263997	.05051741
13	WARM TEST	295.45	-.90886131	.00018783	----------	---------
14	COLD TEST	79.15	-.65883947	.00033909	4.30157446	.04755908
15	WARM TEST	295.45	-.90923003	.00021899	----------	---------
16	COLD TEST	79.15	-.65830962	.00026616	4.28765904	.10792459
17	WARM TEST	295.45	-.90876824	.00020591	----------	---------
18	COLD TEST	79.15	-.65863122	.00024440	4.29911247	.08710502
19	WARM TEST	295.45	-.90890687	.00020242	----------	---------
20	COLD TEST	79.15	-.65907133	.00028194	4.30505349	.08082386

CH. 8 ,155.2 MHz MHz

NOISE FIGURE AVERAGE (dB) = 4.265056465

NOISE POWER STABILITY (K) = .0670344271867

NOISE POWER STABILITY DELTA (K) = .066905015286?

NPS_MAX (K) = .107924594328 NPS_MIN (K) = .0410195790417

INTEGRATION TIME = .165

TEST DATA SHEET 2

LO Frequency Test Data (Paragraph 3 5.1) (A1-2)

Test Setup Verified: Y. Yinh
Signature

Baseplate Temperature: (T_B) 25.2 °C

Compo-nent	Channel No.	V_b(V)	I_b(mA)	P_{dc}(mW)			f_o(GHz)		
				Required (Max)	Measured	Pass/ Fail	Required	Measured	Pass/ Fail
LO	3	N/R		2,700			50.300 ± 0.008		
	4	10.03	176.6	2,700	1771.3	P	52.800 ± 0.003	52.800	P
	5	N/R		2,700			53.596 ± 0.003		
	8	N/R		2,700			55.500 ± 0.008		
Mixer/ Amps	All	10.02	174.8	1,800	09/14/98 N/R 1751.5				
TOTAL				12,600	N/R				

Pass = P, Fail = F

Part No.: 1356409-1

Serial No.: F02

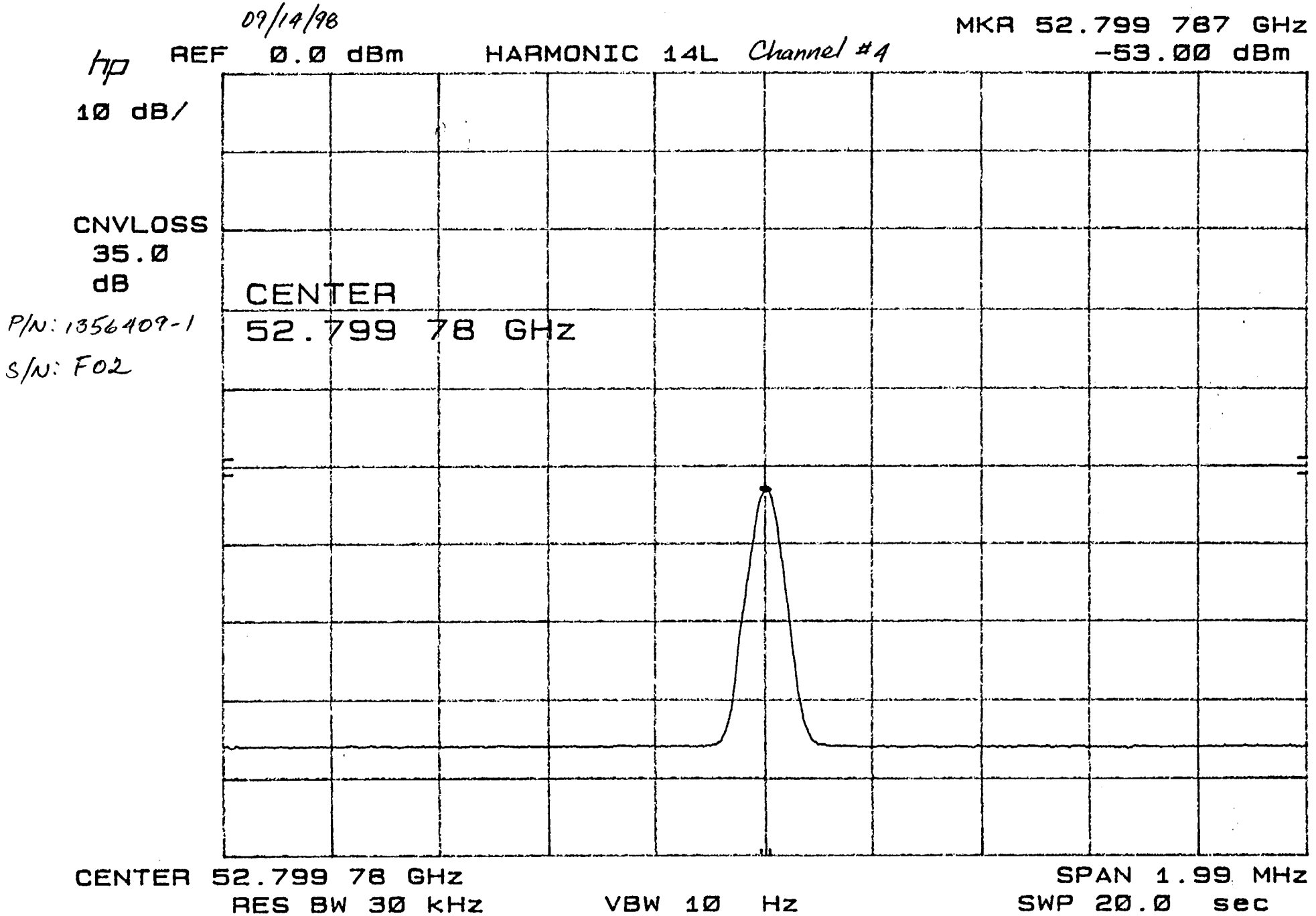
Test Engineer: Y. Yinh

Quality Assurance: 7A 268 SEP 14 '98

Date: 09/14/98

FOR REFERE..E ONLY

09/14/98



P/N: 1356409-1

S/N: F02

TEST DATA SHEET 8 (Sheet 1 of 2)

Bandpass Characteristics Test Data (Paragraph 3.5.3) (A1-2)

Test Setup Verified: Y. Trinh (Signature) Baseplate Temperature (T_B) 25.2 °C

Component	Channel No.	V_b(V)	I_b(mA)	3 dB BW Frequency (MHz) Lower	3 dB BW Frequency (MHz) Higher	3 dB BW Frequency (MHz) Required Max.	3 dB BW Frequency (MHz) Measured	Pass/ Fail
LO	3	N/Rc				~~90~~		
	4	10.03	176.6	7.8	198.2	200	190.4	P
	5	N/Rc				~~170~~		
	8	N/Rc				163		
Mixer/ Amps	All	10.02	174.8					

Part No.: 1356409-1

Serial No.: F02

Test Engineer: Y. Trinh

Quality Assurance: 7A 268 SEP 14 '98

Date: 09/14/98

TEST DATA SHEET 8 (Sheet 2 of 2)
Bandpass Characteristics Test Data (Paragraph 3.5.3) (A1-2)

Test Setup Verified: Y. Yrink (Signature) Baseplate Temperature (T_B) 25.2 °C

Compo-nent	Channel No.	V_b(V)	I_b(mA)	40 dB BW Frequency (MHz) Lower	40 dB BW Frequency (MHz) Higher	40 dB BW Frequency (MHz) (Ref. Only) Required Max.	40 dB BW Frequency (MHz) (Ref. Only) Measured	Pass/ Fail
LO	3	N/RC				234		
	4	10.03	176.6	N/A	N/A	234	N/A	N/A
		Attenuator was boxed down and cannot remove to be measured						
	5	N/RC				221	Y. Yrink 9/14/98 QC 229	
	8	N/RC				429		
Mixer/ Amps	All	10.02	174.8					

Part No.: 1356409-1

Serial No.: F02

Test Engineer: Y. Yrink

Quality Assurance: TA 269 SEP 15 '98

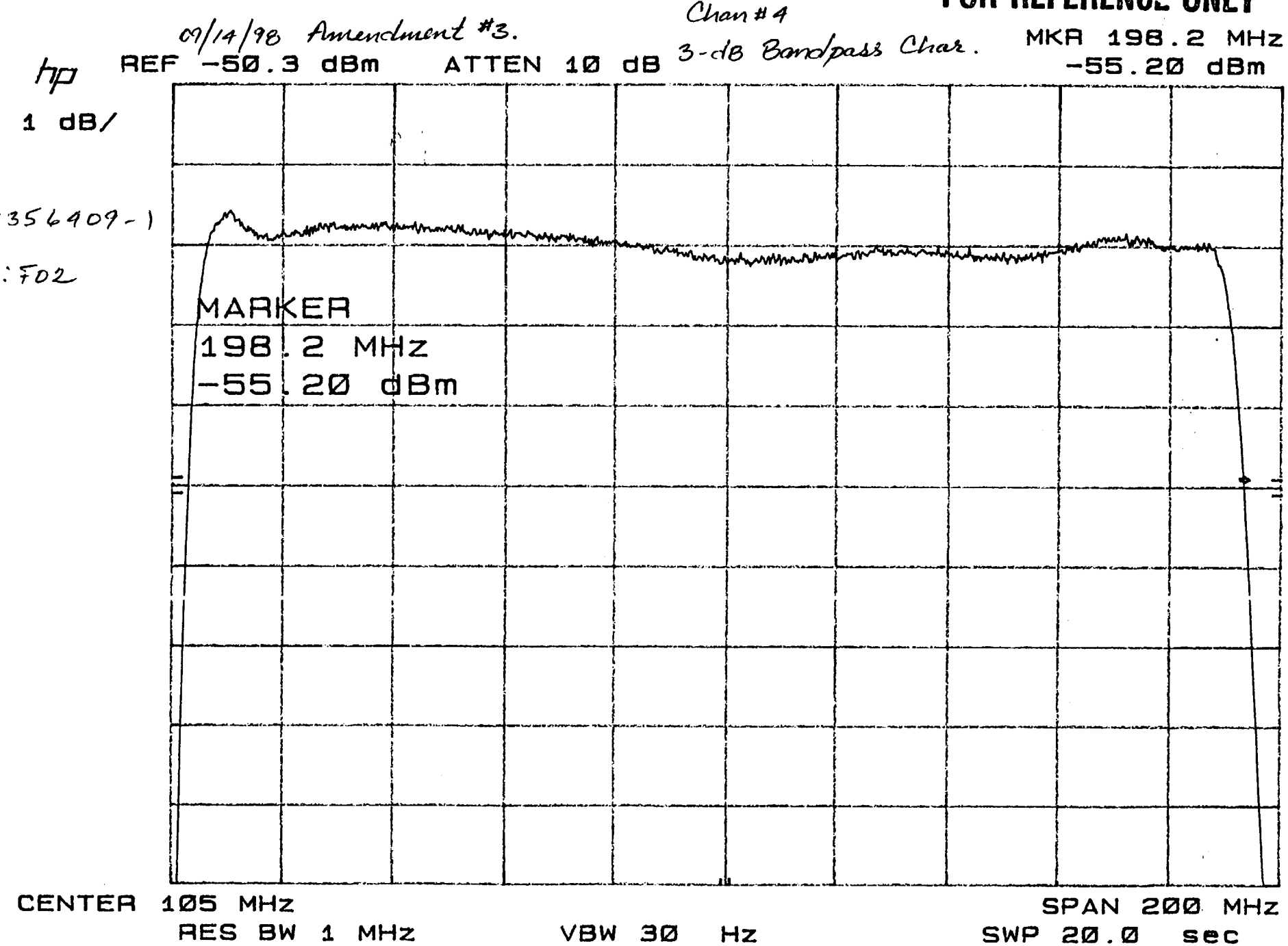
Date: 09/14/98

FOR REFERENCE ONLY

09/14/98 Amendment #3.

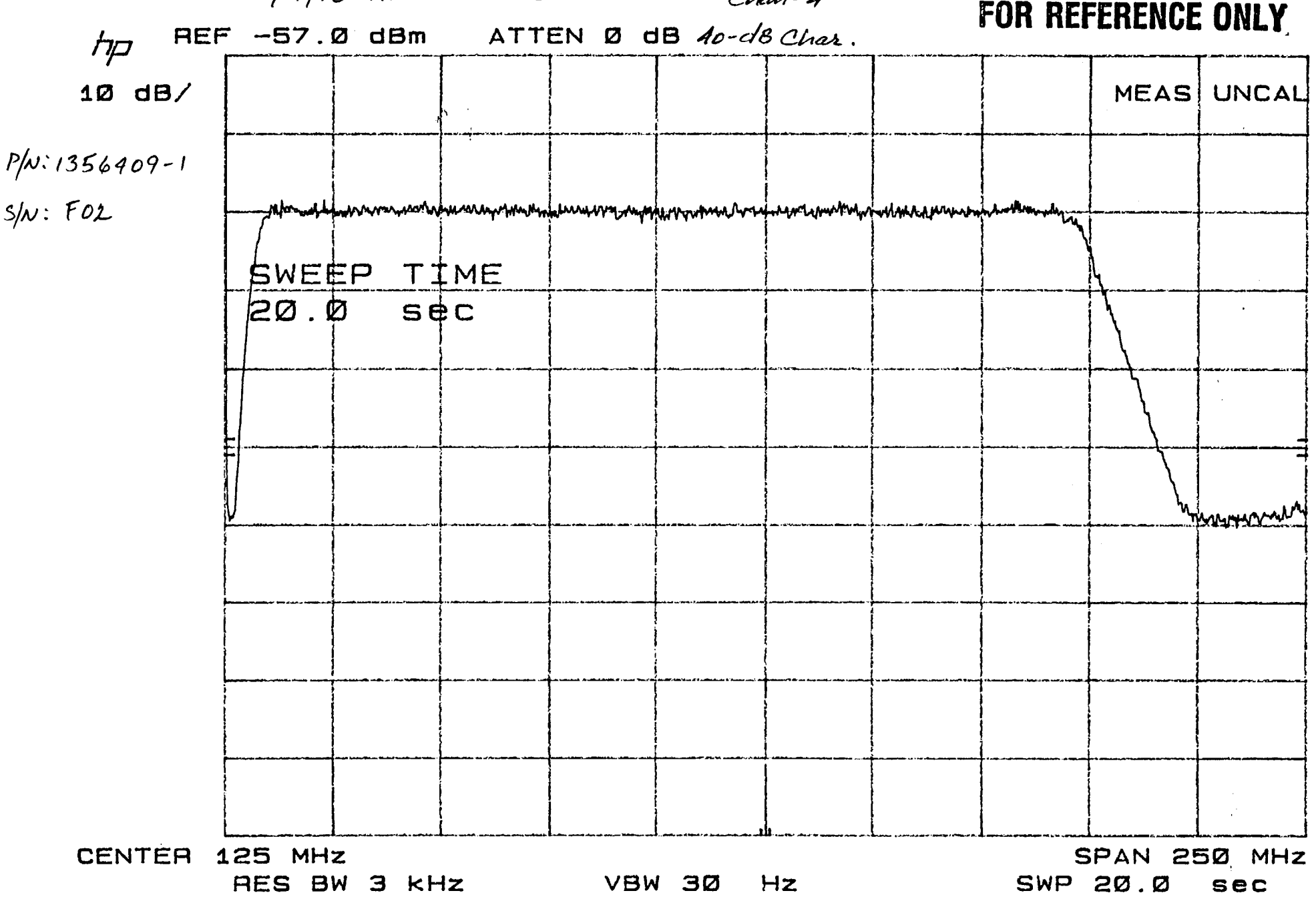
Chan #4

3-dB Bandpass Char.



09/14/98 Amendment #3 Chan #4

FOR REFERENCE ONLY



09/14/98

Chan #4

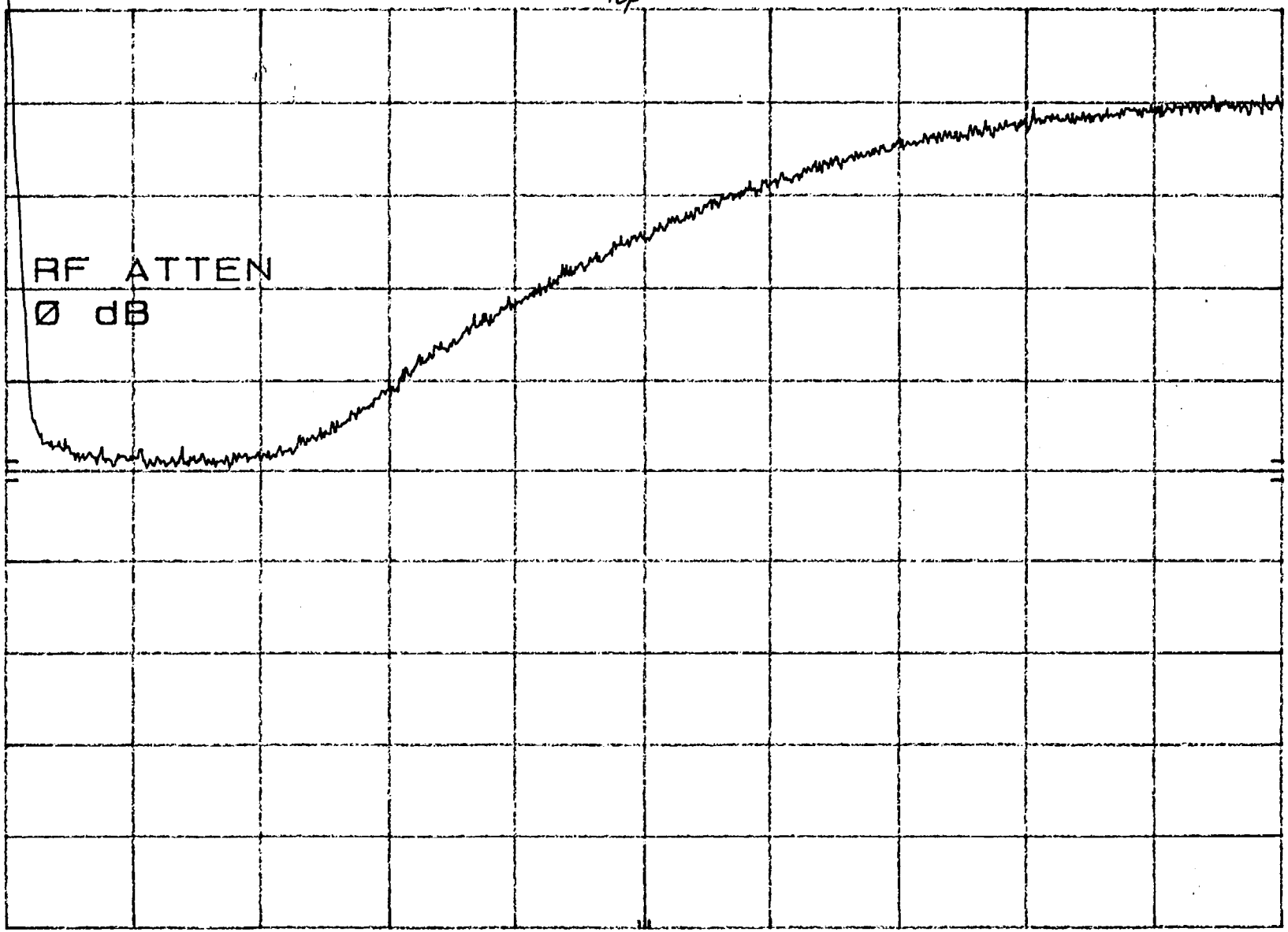
hp REF -57.0 dBm ATTEN 0 dB Stop-Band Char.

FOR REFERENCE ONLY

10 dB/

P/N: 1356409-1

S/N: F02



START 0 Hz STOP 10.0 MHz

RES BW 30 kHz VBW 300 Hz SWP 3.00 sec

TEST DATA SHEET 11 (Sheet 2 of 8)
Noise Figure and Noise Power Stability Test Data (Paragraph 3.5.4) (A1-2)

Test Setup Verified: Y. Trinh (Signature) Baseplate Temperature (T_B) 25.2 °C

Component	Channel No.	V_b(V)	I_b(mA)	T_H(°C)	V_H (V) Mean	V_H (V) Standard Deviation	T_C(°C)	V_C (V) Mean	V_C (V) Standard Deviation
LO	4	10.03	176.4	22.6	-.92463	.000179	-194	-.62543	.000264
				22.6	-.92447	.000174	-194	-.62523	.000282
				22.6	-.92444	.000178	-194	-.62501	.000197
				22.6	-.92417	.000194	-194	-.62516	.000200
				22.6	-.92393	.000191	-194	-.62479	.000207
				22.6	-.92358	.000199	-194	-.62407	.000195
				22.6	-.92345	.000191	-194	-.62451	.000219
				22.6	-.92317	.000177	-194	-.62386	.000225
				22.6	-.92297	.000167	-194	-.62406	.000202
				22.6	-.92271	.000212	-194	-.62408	.000211
Mixer/ Amps	All	10.02	174.8						
IF Amps	All	N/A	N/A						

Part No.: 1356409-1
Serial No.: F02
Test Engineer: Y. Trinh
Quality Assurance: 268 SEP 14
Date: 09/14/98

TEST DATA SHEET 11 (Sheet 6 of 8)

Noise Figure and Noise Power Stability Test Data (Paragraph 3.5.4) (A1-2)

Test Setup Verified: Y. Trinh (Signature) Baseplate Temperature (T_B) 25.2 °C

Channel No.	NF (dB)				NPS (K)				
	Required (Max)	Measured	Average	Pass/Fail	Required (Max)	Measured	Average	Delta	Pass/Fail
4		3.59				0.05			
		3.59				0.04			
		3.59				0.05			
		3.60				0.07			
		3.59				0.07			
		3.59				0.08			
		3.59				0.07			
		3.59				0.05			
		3.59				0.02			
		3.59				0.10			
	4.95		3.59	P	0.08	N/A	0.06	0.08	P

Pass = P, Fail = F

Part No.: 1356409-1

Serial No.: F02

Test Engineer: Y. Trinh

Quality Assurance: 269 SEP 14 '98

Date: 09/14/98

AMSU-A TEST **FOR REFERENCE ONLY**

AMSU-A, A1-2, CH 4 RETEST, 9/14/98 P/N:1356409-1 S/N: F02

SEQ	TEMP_TEST	TEST TEMP	VOLTAGE	STD_DEV	NF (dB)	NPS(K)
1	WARM TEST	295.75	-.92462925	.00017920	----------	----------
2	COLD TEST	79.15	-.62542635	.00026433	3.59515459	.05066847
3	WARM TEST	295.75	-.92446948	.00017416	----------	----------
4	COLD TEST	79.15	-.62522638	.00028185	3.59380906	.04047331
5	WARM TEST	295.75	-.92444236	.00017845	----------	----------
6	COLD TEST	79.15	-.62500946	.00019695	3.59090298	.04927584
7	WARM TEST	295.75	-.92416635	.00019362	----------	----------
8	COLD TEST	79.15	-.62516417	.00019965	3.59590072	.07352274
9	WARM TEST	295.75	-.92392575	.00019092	----------	----------
10	COLD TEST	79.15	-.62479006	.00020672	3.59280445	.06974761
11	WARM TEST	295.75	-.92357718	.00019894	----------	----------
12	COLD TEST	79.15	-.62407321	.00019512	3.58576150	.08061893
13	WARM TEST	295.75	-.92345272	.00019064	----------	----------
14	COLD TEST	79.15	-.62451226	.00021859	3.59342105	.06949108
15	WARM TEST	295.75	-.92317394	.00017683	----------	----------
16	COLD TEST	79.15	-.62385587	.00022478	3.58656850	.04655976
17	WARM TEST	295.75	-.92296993	.00016721	----------	----------
18	COLD TEST	79.15	-.62405665	.00020190	3.59152848	.02104416
19	WARM TEST	295.75	-.92271334	.00021184	----------	----------
20	COLD TEST	79.15	-.62407971	.00021109	3.59441075	.09669904

CH. 4 ,190.4 MHz MHz

NOISE FIGURE AVERAGE (dB) = 3.59202743598

NOISE POWER STABILITY (K) = .0598100930674

NOISE POWER STABILITY DELTA (K) = .0756548796819

NPS_MAX (K) = .0966990392074 NPS_MIN (K) = .0210441595255

INTEGRATION TIME = .165

TEST DATA SHEET 17

Temperature Sensor and Thermistor Test Data (Paragraph 3.6.1) (A1-2)

Test Setup Verified: J. Tsuno Signature Baseplate Temperature (T_B) 22.7 °C

Reference Designation	Specification	Measured Value		Pass/Fail
RT 41	2200 ± 100 Ω	2174	Ω	P
RT 42	2200 ± 100 Ω	2176	Ω	P
RT 43	2200 ± 100 Ω	2175	Ω	P
RT 44	2200 ± 100 Ω	2170	Ω	P
RT 12	2200 ± 100 Ω	2174	Ω	P
RT 17	2200 ± 100 Ω	2174	Ω	P
RT 18	2200 ± 100 Ω	2170	Ω	P
RT 19	2200 ± 100 Ω	>10M	Ω	F
RT 22	2200 ± 100 Ω	0.5	Ω	F
RT 33	2200 ± 100 Ω	2175	Ω	P
TB 58	3000 ± 100 Ω	2994	Ω	P
TB 59	3000 ± 100 Ω	3002	Ω	P
TB 54	4.1 – 4.6 V	4.34	V	P

REFER TAR # 2736

Pass = P, Fail = F

RE-TEST RT19 = 2170 Ω (PASS) J. Tsuno 8/17/98
RT22 = 2168 Ω (PASS)

Part No.: 1356409-1

Serial No.: F02

Test Engineer:

Quality Assurance: 8/18/98 Void R.Nano

Date: 8/7/98

See TAR #2736

TEST DATA SHEET 18

Temperature Sensor and Thermistor Test Data (Paragraph 3.6.1) (A2)

Test Setup Verified:_____ Baseplate Temperature (T_B) _____°C
Signature

Reference Designation	Specification	Measured Value	Pass/Fail
RT 12	2200 ± 100 Ω	Ω	
RT 19	2200 ± 100 Ω	Ω	
RT 20	2200 ± 100 Ω	Ω	
RT 13	2200 ± 100 Ω	Ω	
RT 14	2200 ± 100 Ω	Ω	
RT 17	2200 ± 100 Ω	Ω	
TB 58	3000 ± 100 Ω	Ω	
TB 59	3000 ± 100 Ω	Ω	
TB 53	4.1 – 4.6 V	V	

Pass = P, Fail = F

Part No.:_____ Test Engineer:_____

Serial No.:_____ Quality Assurance:_____

Date:_____

TEST DATA SHEET 21

Survival Heater and Thermal Switch Test Data (Paragraph 3.6.3) (A1-2)

Test Setup Verified: R Jones Signature Baseplate Temperature (T_B) 22.4 °C

Reference Designation	Open Switch		Closed Switch		
	>10 MΩ	Pass/Fail	Specification	Measured Value	Pass/Fail
HR1/TS1	>50MΩ	P	40 - 48 Ω	45.2 Ω	P
	>50MΩ	P		44.2 Ω	P
HR2/TS2	>50MΩ	P		45.6 Ω	P
	>50MΩ	P		43.7 Ω	P

Pass = P, Fail = F

Part No.: 1356409-1

Serial No.: F02

Test Engineer: [signature]

Quality Assurance: [signature] 8/12/98 228

Date: 8/7/98

TEST DATA SHEET 22

Survival Heater and Thermal Switch Test Data (Paragraph 3.6.3) (A2)

Test Setup Verified:_____ Baseplate Temperature (T_B) _____°C
Signature

Reference Designation	Open Switch		Closed Switch		
	>10 MΩ	Pass/Fail	Specification	Measured Value	Pass/Fail
HR1/TS1			50 - 65 Ω		
HR2/TS2					

Pass = P, Fail = F

Part No.:_____ Test Engineer:_____

Serial No.:_____ Quality Assurance:_____

Date:_____

TEST DATA SHEET 23 (Sheet 1 of 3)
Bias Voltage Verification Test Data (Paragraph 3.6.4) (A1-1)

Test Setup Verified:_____ Baseplate Temperature (T_B) _____°C
Signature

Reference Designation	Specification	Measured Value (V)	Pass/Fail
Mixer/IF AMP Ch 6, 7, 15, 9-14	+10 ±0.1		
DRO Ch 7	+10 ±0.1		
DRO Ch 15	+15 ±0.15		
PLO +15	+15 ±0.15		
PLO -15	-15 ±0.15		
IF AMP Ch 9-14	+8 ±0.08		

Part No.:_____ Test Engineer:_____

Serial No.:_____ Quality Assurance:_____

Date:_____

TEST DATA SHEET 23 (Sheet 2 of 3)
Bias Voltage Verification Test Data (Paragraph 3.6.4) (A1-2)

Test Setup Verified: J. Tsung
Signature

Baseplate Temperature (T_B) 22.9 °C

Reference Designation	Specification	Measured Value (V)	Pass/Fail
Mixer/IF AMP Ch 3, 4, 5, 8	+10 ±0.1	10.01	P
DRO Ch 5	+10 ±0.1	9.98	P
DRO Ch 4	+10 ±0.1	10.02	P
DRO Ch 3	+10 ±0.1	9.96	P
DRO Ch 8	+10 ±0.1	9.98	P

Part No.: 1356409-1

Serial No.: F02

Test Engineer: [signature]

Quality Assurance: [signature] 8/19/98 (TA 228)

Date: 8/7/98

TEST DATA

FOR

AMSU-A1-1 (P/N: 1356429-1, S/N: F02)

T. Trinh QC 229 8/27/98

10. APPENDIX A - TEST DATA SHEETS

This appendix contains the test data sheets referenced in Section 3 of this test procedure.

TEST DATA SHEETS

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3	LO Frequency Test Data (Paragraph 3.5.1) (A2)	A-4
4	IF Output Power Test Data (Paragraph 3.5.2) (A1-1)	A-5
5	IF Output Test Data (Paragraph 3.5.2) (A1-2)	A-6
6	IF Output Test Data (Paragraph 3.5.2) (A2)	A-7
7	Bandpass Characteristics Test Data (Paragraph 3.5.3) (A1-1)	A-8
8	Bandpass Characteristics Test Data (Paragraph 3.5.3) (A1-2)	A-10
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22 23	Bias Voltage Verification Test Data (Paragraph 3.6.4) (A1-1, A1-2, A2)	A-55 66

TEST DATA SHEET 1

LO Frequency Test Data (Paragraph 3.5.1) (A1-1)

Test Setup Verified: J. Murray (Signature) Baseplate Temperature (T_B) 30.1 °C

Component	Channel No.		V_b(V)	I_b(mA)	P_{dc}(mW) Required (Max)	P_{dc}(mW) Measured	P_{dc}(mW) Pass/ Fail	f_o(GHz) Required	f_o(GHz) Measured	f_o(GHz) Pass/ Fail
LO	6		9.98	179.4	2,700	1790	P	54.400 ± 0.003	54.400	P
	7		9.92	194.6	2,700	1930	P	54.940 ± 0.003	54.940	P
	LO No. 1	9	Positive 15.1	522.8	9,000 (13,500)*	7897	P	57.290344 ± 0.000086	[illegible]	[illegible]
		10								
		11							57.290327	P
		12	Negative 15.1	57.8	1,500	873	P		[illegible]	[illegible]
		13								
		14								
	LO No. 2	9	Positive 15.1	520.9	9,000 (13,500)*	7866	P	57.290344 ± 0.000086	[illegible]	[illegible]
		10								
		11							57.290315	P
		12	Negative 15.1	66.3	1,500	1001	P		[illegible]	[illegible]
		13								
		14								
	15		14.87	177.8	3500	2644	P	88.980 ± 0.080	88.984	P
Mixer/ Amps	All		9.93	242.8	2,550	2411	[illegible]			
IF Amps	All		7.93	263.2	5,500	2087				
TOTAL			Primary (LO #1)		24,510 (29,010)*	N/A				
			Redundancy (LO #2)		24,510 (29,010)*	N/A				

* Indicates required values for the PLO specified in AE-26660. Pass = P, Fail = F

PLO 1 Lock Detect ☐ PLO 2 Lock Detect ☐

Part No.: 1356429-1

Serial No.: F02

Test Engineer: [signature]

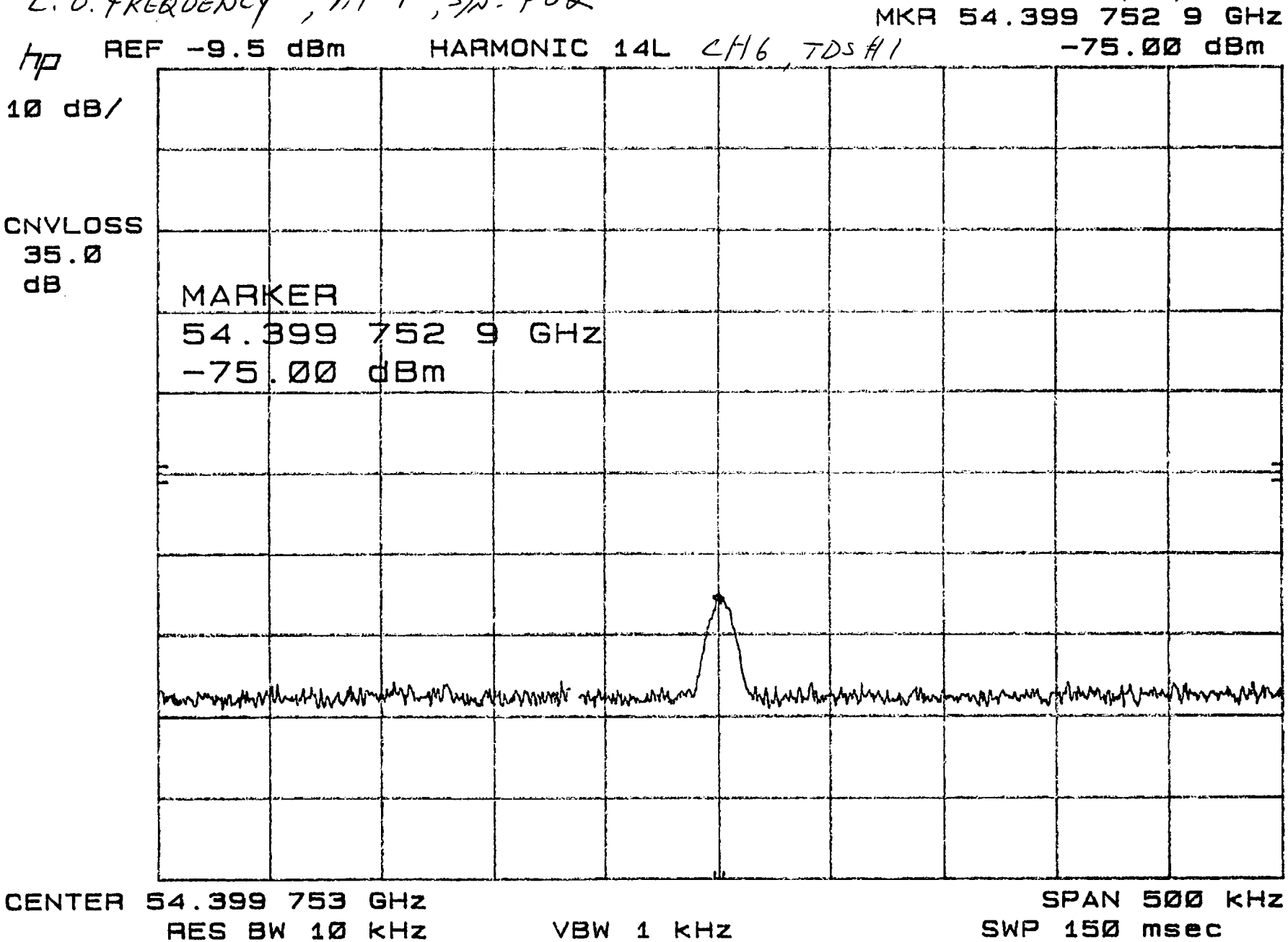
Quality Assurance: [signature] (TA 267) AUG 28 '98

Date: 8/12/98

L.O. FREQUENCY, A1-1, S/N: F02

FOR REFERENCE ONLY

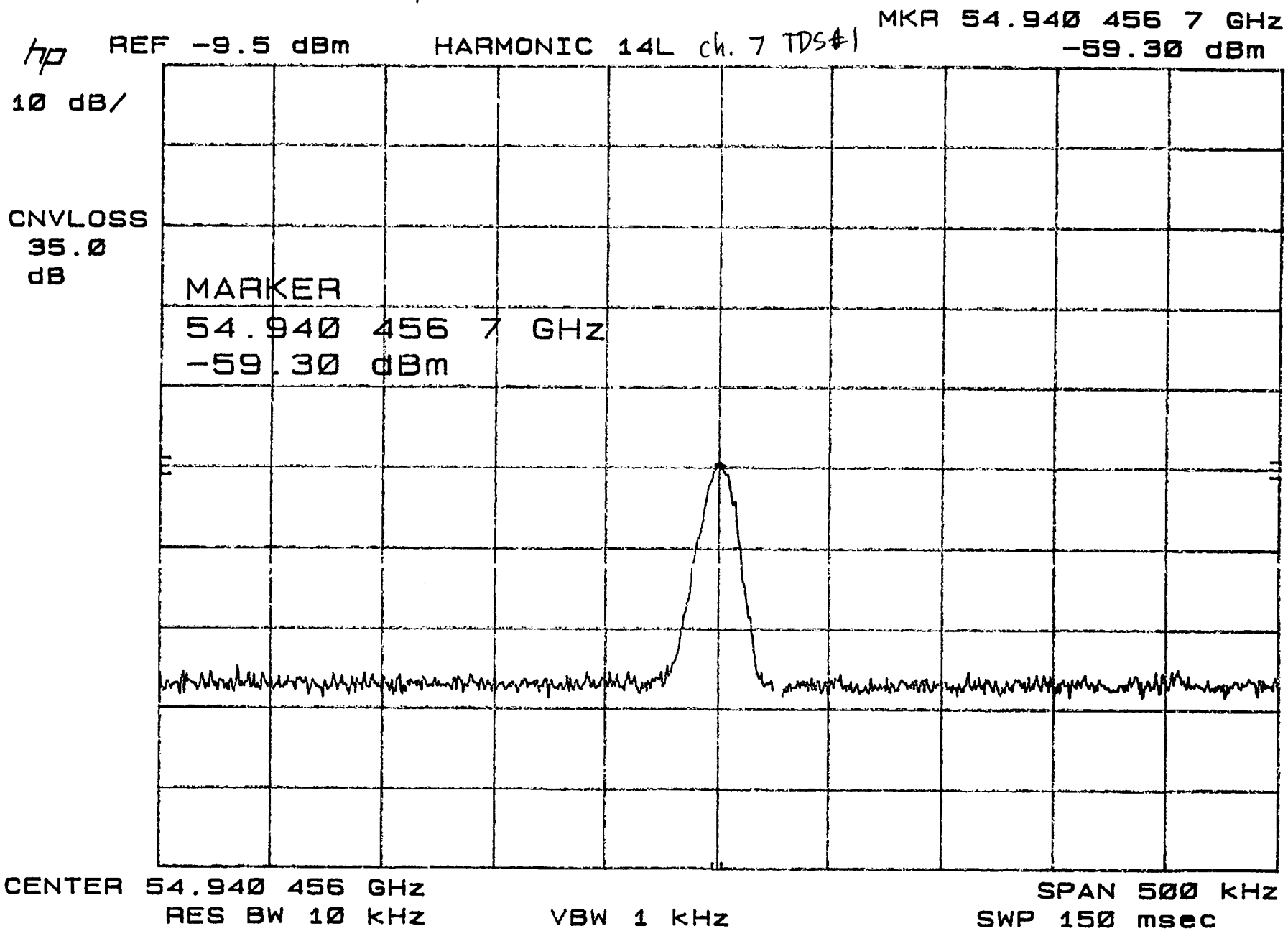
8/12/98



L.O. freq. Af-1, Fo2

FOR REFERENCE ONLY

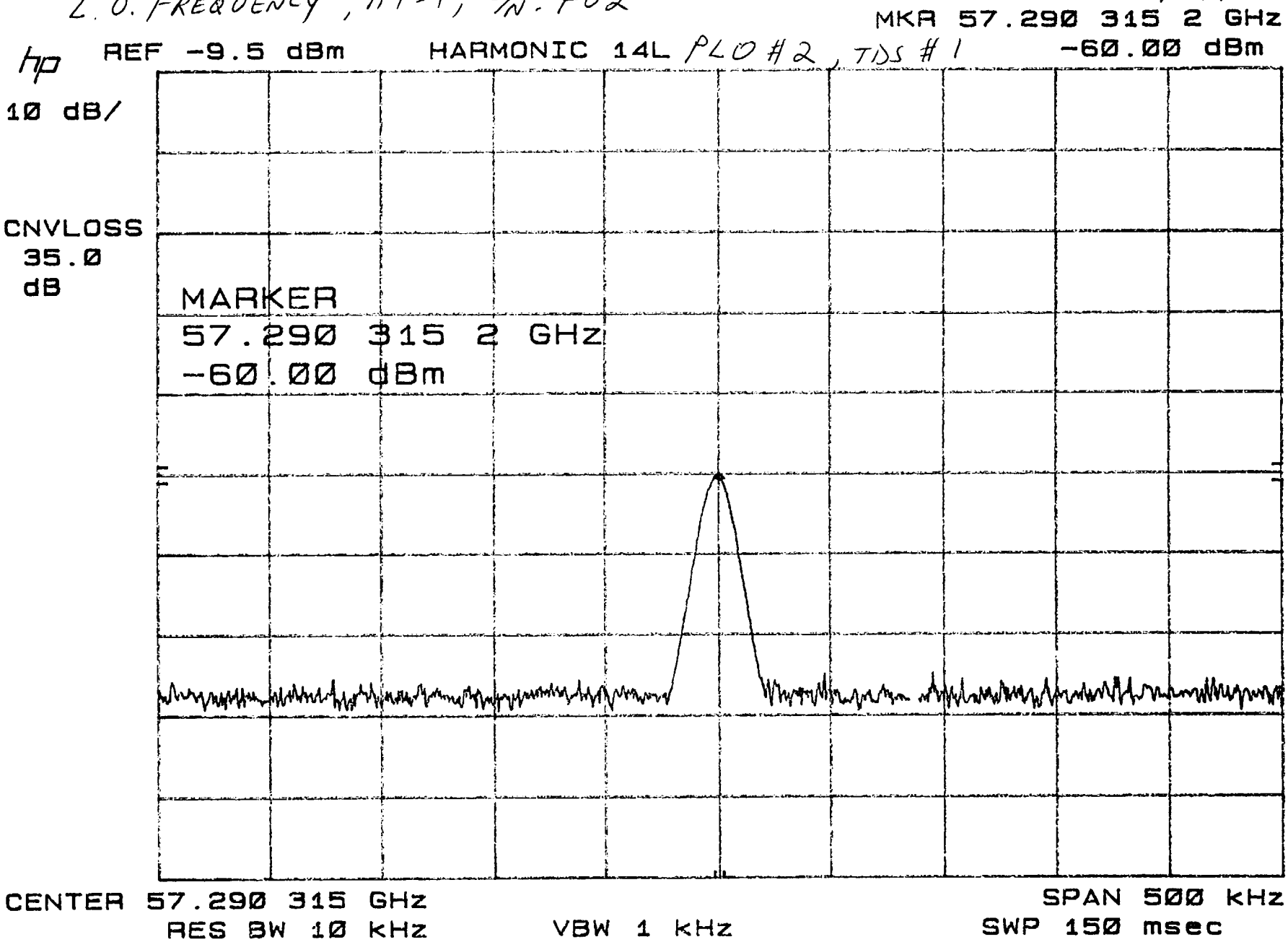
8/12/98



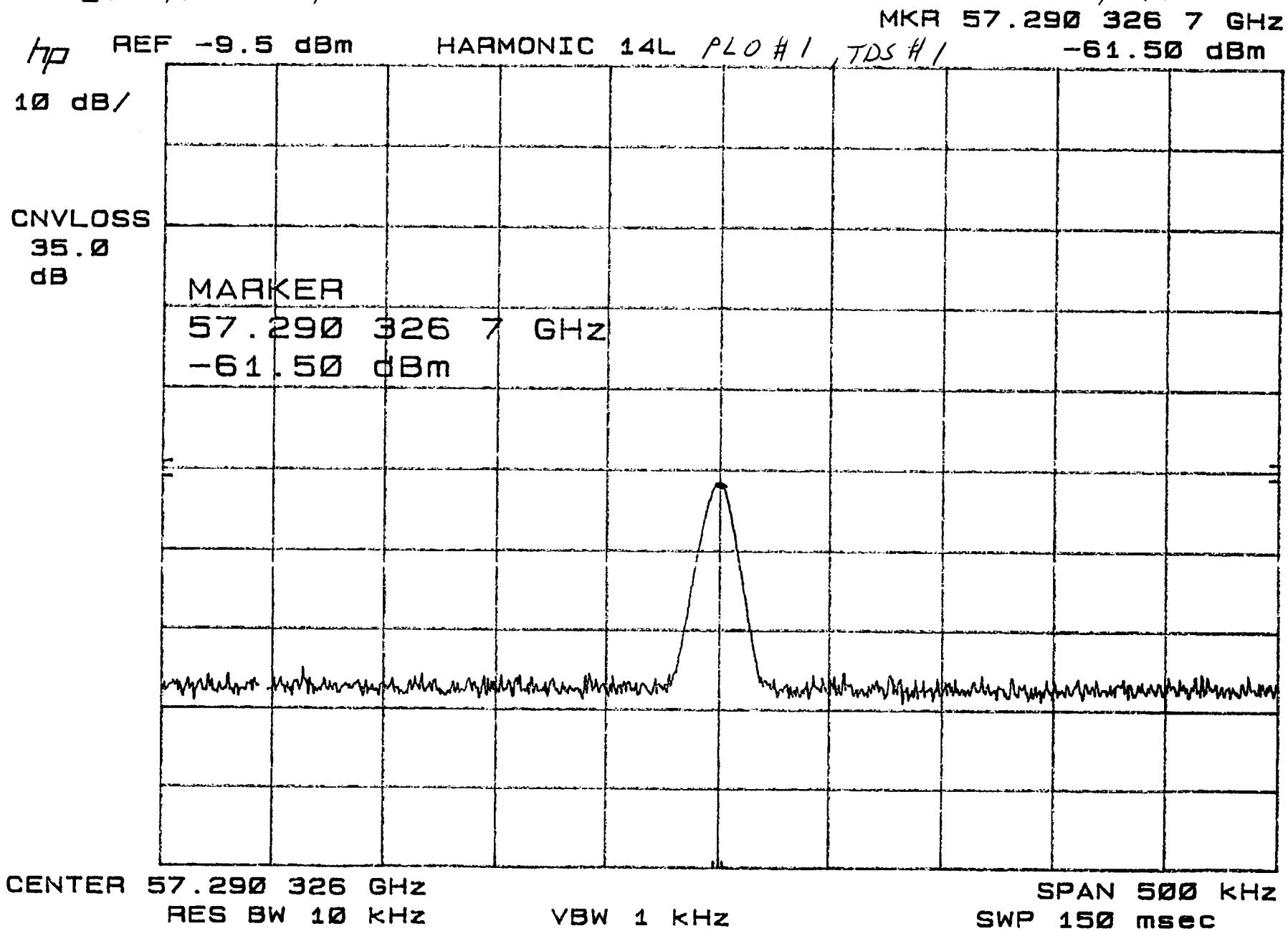
L.O. FREQUENCY, A1-1, S/N: F02

FOR REFERENCE ONLY

8/12/98



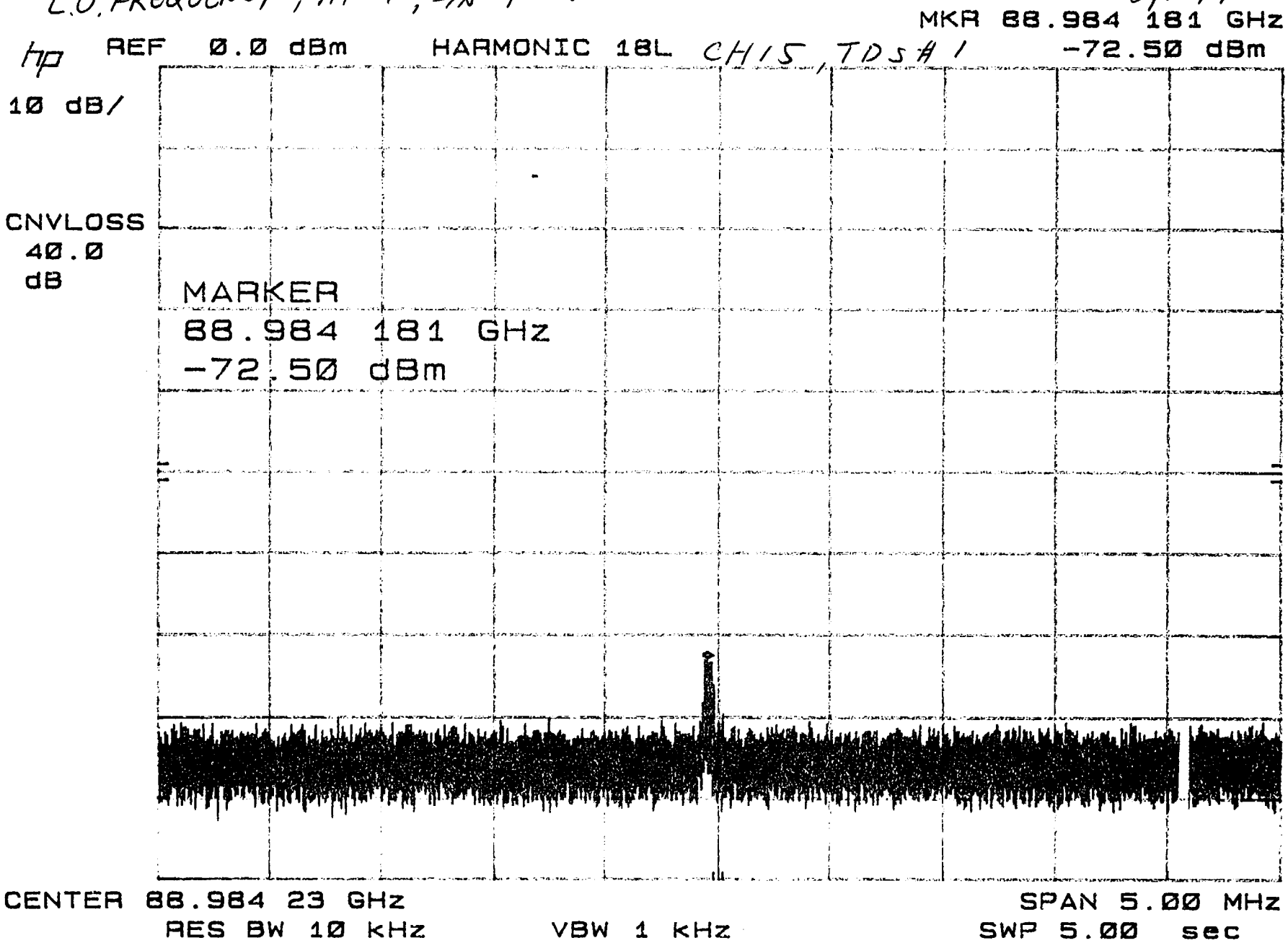
L.O. FREQUENCY, A1-1, S/N: F02 **FOR REFERENCE ONLY** 8/12/98



L.O. FREQUENCY, A1-1, S/N: F02

FOR REFERENCE ONLY

8/12/98



TEST DATA SHEET 4

IF Output Power Test Data (Paragraph 3.5.2) (A1-1)

Test Setup Verified: A. Tuna Signature Baseplate Temperature (T_B) 29.6 °C

Component	Channel No.		V_b(V)	I_b(mA)	P_o(dBm)	Atten (dB)	P_o(dBm) Required	P_o(dBm) Measured	Pass/ Fail
LO	6		9.98	179.4	-19.28	8	-27.0 ± 1.0	-27.47	P
	7		9.92	194.6	-19.37	8	-27.0 ± 1.0	-27.54	P
	LO No. 1	9	Positive 15.1	523.0	-20.71	7	-27.0 ± 1.0	-27.86	P
		10			-21.13	6	-27.0 ± 1.0	-27.06	P
		11			-21.08	6	-27.0 ± 1.0	-26.97	P
		12	Negative 15.1	57.8	-20.29	7	-27.0 ± 1.0	-27.41	P
		13			-20.80	6	-27.0 ± 1.0	-26.68	P
		14			-21.64	6	-27.0 ± 1.0	-27.52	P
	LO No. 2	9	Positive 15.1	520.9	[redacted]		-27.0 ± 1.0	-27.82	P
		10					-27.0 ± 1.0	-27.07	P
		11					-27.0 ± 1.0	-27.00	P
		12	Negative 15.1	66.3			-27.0 ± 1.0	-27.43	P
		13					-27.0 ± 1.0	-27.72	P
		14					-27.0 ± 1.0	-27.53	P
	15		14.87	177.8	-24.11	3	-27.0 ± 1.0	-27.17	P
Mixer/ Amps	All		9.93	242.8	[redacted]				
IF Amps	All		7.93	263.2					

Pass = P, Fail = F

Part No.: 1356429-1

Serial No.: F02

Test Engineer: [signature]

Quality Assurance: [signature] IA 267 AUG 23 '98

Date: 8/12/98

TEST DATA SHEET 5

IF Output Test Data (Paragraph 3.5.2) (A1-2)

Test Setup Verified:_____ Baseplate Temperature (T_B) _____°C
Signature

Compo-nent	Channel No.	V_b(V)	I_b(mA)	P_o(dBm)	Atten (dB)	P_o(dBm)		
						Required	Measured	Pass/ Fail
LO	3					-27.0 ± 1.0		
	4					-27.0 ± 1.0		
	5					-27.0 ± 1.0		
	8					-27.0 ± 1.0		
Mixer/ Amps	All							

Pass = P, Fail = F

QC 229 8/28/98

Part No.:_____ Test Engineer:_____

Serial No.:_____ Quality Assurance:_____

Date:_____

Y. Yuen 8/27/98 (QC 229)

TEST DATA SHEET 7 (Sheet 1 of 2)

Bandpass Characteristics Test Data (Paragraph 3.5.3) (A1-1)

Test Setup Verified: Q. Juno Signature Baseplate Temperature (T_B) 30.0 °C

Component	Channel No.	V_b(V)	I_b(mA)	3 dB BW Frequency (MHz)		3 dB BW Frequency (MHz)		Pass/Fail
				Lower	Higher	Required MAX	Measured	
LO	6	9.98	179.4	~~67.0~~ 195.8	202.0	200	~~195.8~~ 196.2	P
	7	9.92	194.6	7.4	200.0	200	192.6	P
LO No. 1	9	Positive		9.1	165.1	165	156.0	P
	10	15.1	523.0	178.8	255.8	78	77.0	P
				256.8	292.6	36	35.4	P
	11			353.1	387.6	36	34.5	P
Delete Line	~~12~~ 18 ~~7.7~~	Negative		292.5	308.2	16	15.7	P
				337.1	352.5	16	15.4	P
	13	15.1	57.8	308.6	316.5	8	7.9	P
				328.75	336.75	8	8.0	P
				316.28	319.26	3	2.98	P
	14			325.34	328.30	3	2.96	P
LO No. 2	9	Positive	N/A	9.3	165.1	165	155.8	P
	10	15.1		178.8	255.8	78	77.0	P
			520.9	256.8	292.2	36	35.4	P
	11			353.1	387.6	36	34.5	P
	12	Negative	N/A	292.5	308.2	16	15.7	P
				337.1	352.5	16	15.4	P
	13	15.1	66.3	328.70	336.70	8	8.0	P
				308.6	316.5	8	7.9	P
	14		N/A	316.30	319.26	3	2.96	P
				325.36	328.30	3	2.94	P
	15	14.87	177.8	498.0	1480.0	1000	982.0	P
Mixer/Amps	All							
IF Amps	All							

Part No.: 1356429-1

Serial No.: F02

Test Engineer: [signature]

Quality Assurance: [signature] (QA 267) AUG 28 '98

Date: 8/12/98

TEST DATA SHEET 6

IF Output Test Data (Paragraph 3.5.2) (A2)

Test Setup Verified:_____ Baseplate Temperature (T_B) _____°C
Signature

Compo-nent	Channel No.	V_b(V)	I_b(mA)	P_o(dBm)	Atten (dB)	P_o(dBm)		
						Required	Measured	Pass/ Fail
LO	1					-27.0 ± 1.0		
	2			N/A		-27.0 ± 1.0		
Mixer/ Amps	All							

Pass = P, Fail = F

QC 229 5/8/98

Part No.:_____ Test Engineer:_____

Serial No.:_____ Quality Assurance:_____

Date:_____

Y. Yuri 8/27/98 QC 229

TEST DATA SHEET 7 (Sheet 2 of 2)
Bandpass Characteristics Test Data (Paragraph 3.5.3) (A1-1)

Test Setup Verified: J. Yuri Signature Baseplate Temperature (T_B) 29.7 °C

Component	Channel No.	V_b(V)	I_b(mA)	40 dB BW Frequency (MHz)		40 dB BW Frequency (MHz)		Pass/Fail
				Lower	Higher	Required MAX (Ref Only)	Measured	
LO	6	9.9	179.4	2.83	222.5	520	220.2	P
	7	9.92	194.6	2.3	221.8	520	219.5	P
LO No. 1	9	Positive 15.1	N/A	2.0	181.6	429	179.6	P
	10		523.0	170.5	265.6	101	95.1	P
	11		N/A	N/A	N/A	47	N/A	N/A
	12	Negative 15.1	N/A	N/A	N/A	21	N/A	N/A
	13		5.8	N/A	N/A	10	N/A	N/A
	14		N/A	N/A	N/A	4	N/A	N/A
LO No. 2	9	Positive 15.1	N/A	2.2	180.2	429	178.0	P
	10		520.9	170.5	264.9	101	94.4	P
	11		N/A	N/A	N/A	47	N/A	N/A
	12	Negative 15.1	N/A	N/A	N/A	21	N/A	N/A
	13		66.3	N/A	N/A	10	N/A	N/A
	14		N/A	N/A	N/A	4	N/A	N/A
	15	14.87	177.8	N/A	N/A	7800	N/A	N/A
Mixer/Amps	All							
IF Amps	All							

Part No.: 1356429-1

Serial No.: F02

Test Engineer: [signature]

Quality Assurance: [signature] TA 267 AUG 28 '98

Date: 8/12/98

TEST DATA SHEET 8 (Sheet 1 of 2)
Bandpass Characteristics Test Data (Paragraph 3.5.3) (A1-2)

Test Setup Verified:_____ Baseplate Temperature (T_B) _____°C
Signature

Compo-nent	Channel No.	V_b(V)	I_b(mA)	3 dB BW Frequency (MHz)		3 dB BW Frequency (MHz)		Pass/ Fail
				Lower	Higher	Required Max.	Measured	
LO	3					90		
	4					200		
	5					170		
	8					163		
Mixer/ Amps	All							

N/A

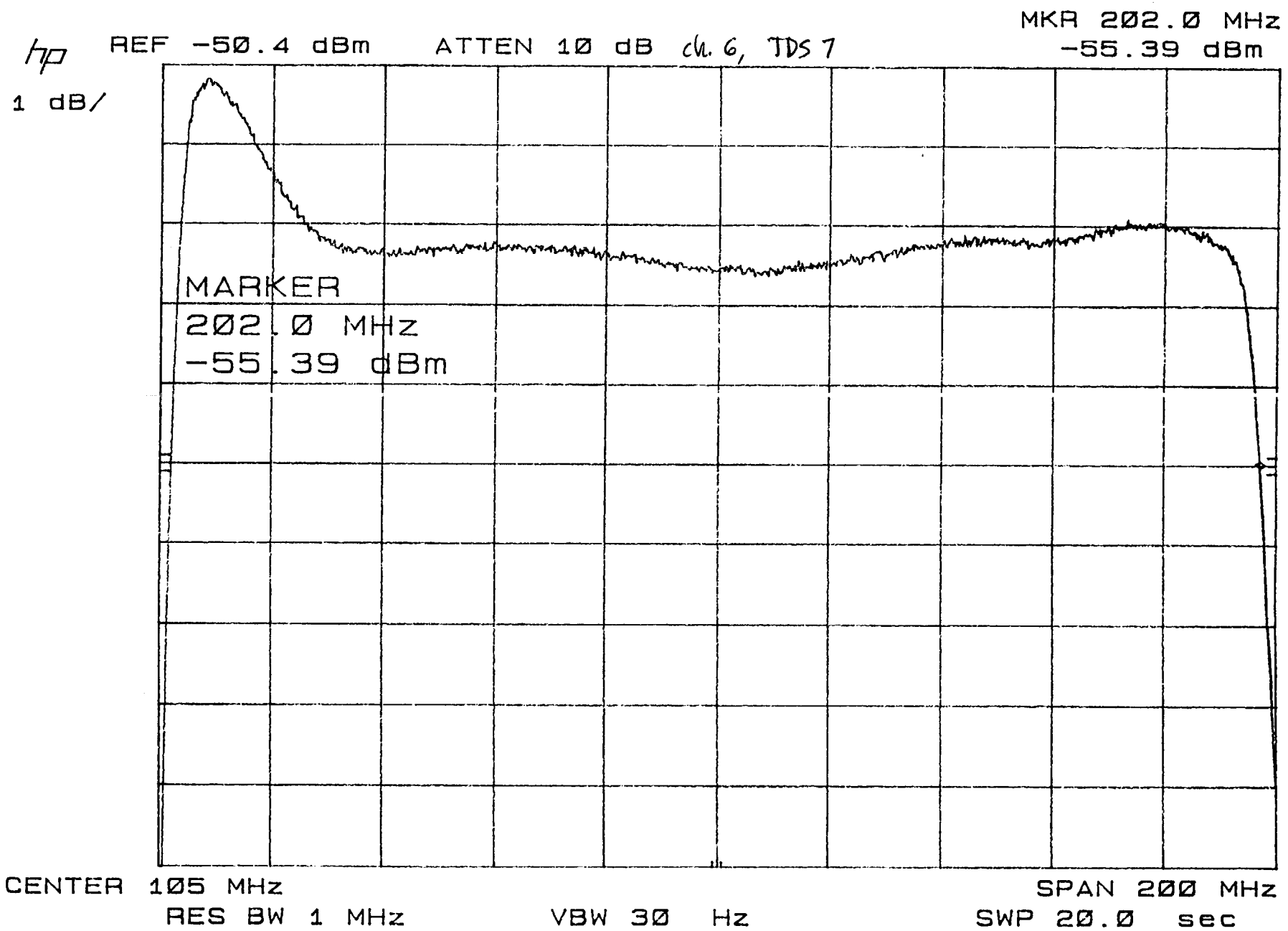
QC 8/25/98

Part No.:_____ Test Engineer:_____

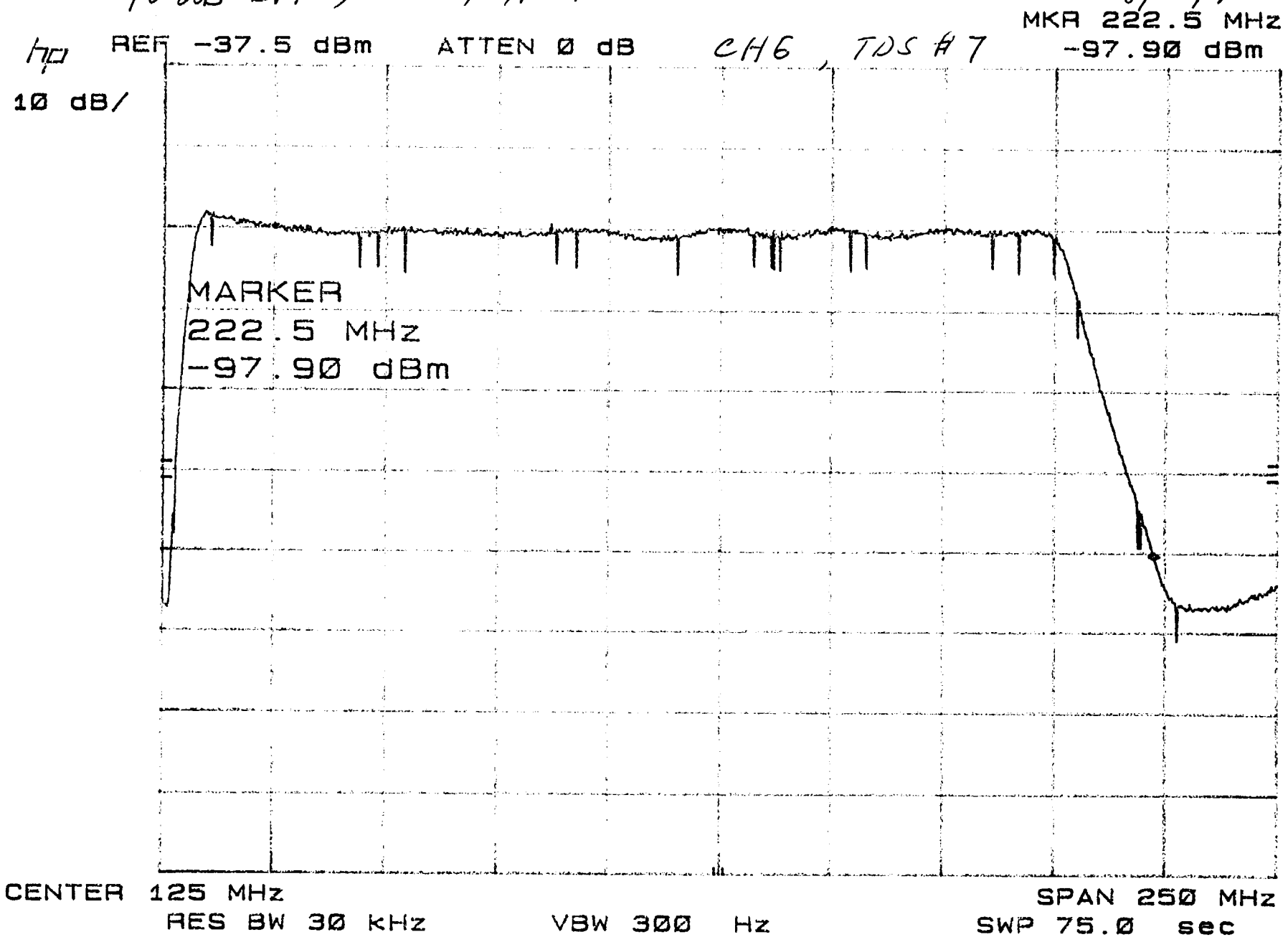
Serial No.:_____ Quality Assurance:_____

Date:_____

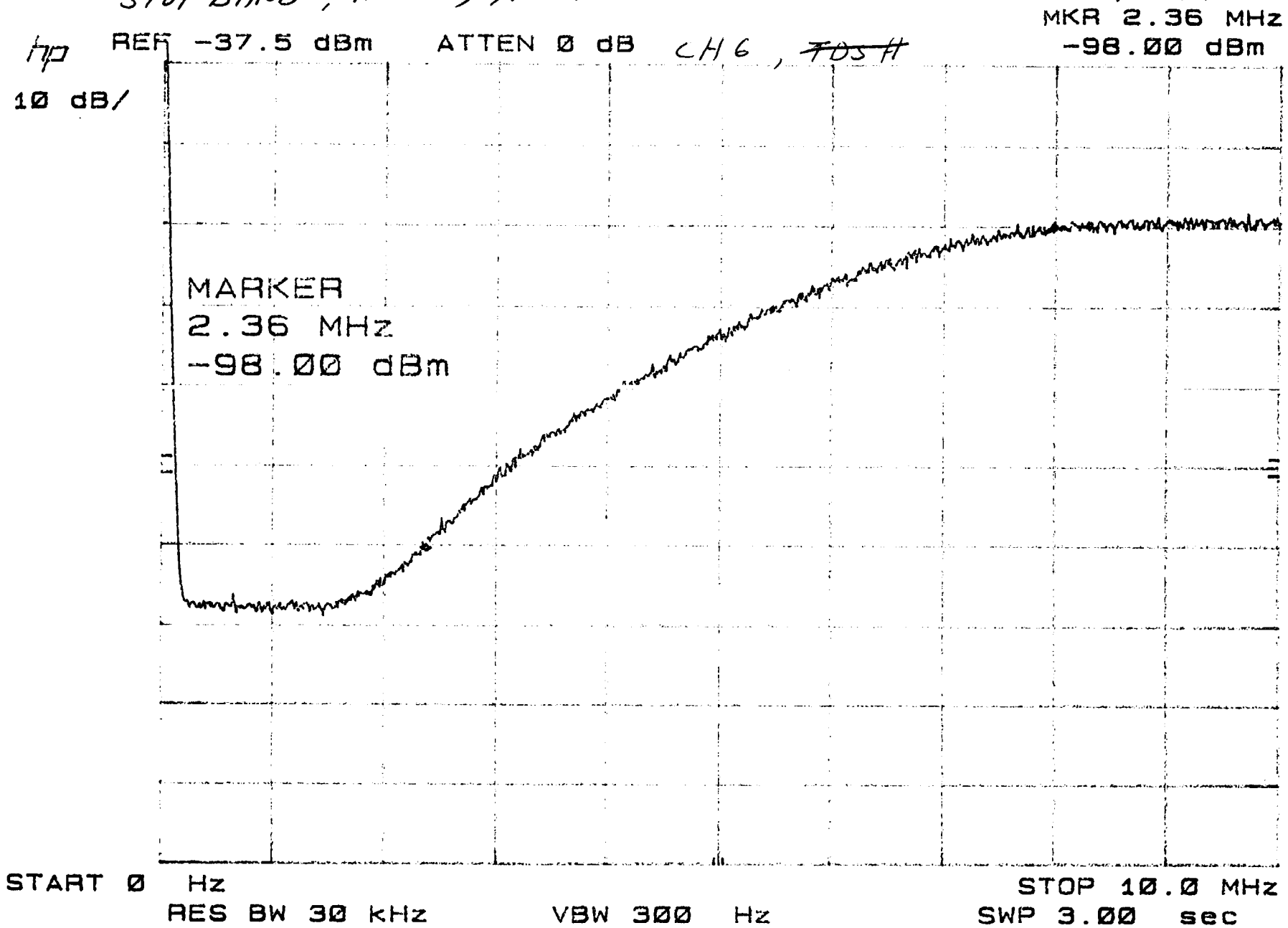
3-dB Bandpass, A1-1, S/n F02 **FOR REFERENCE ONLY** 8/17/98



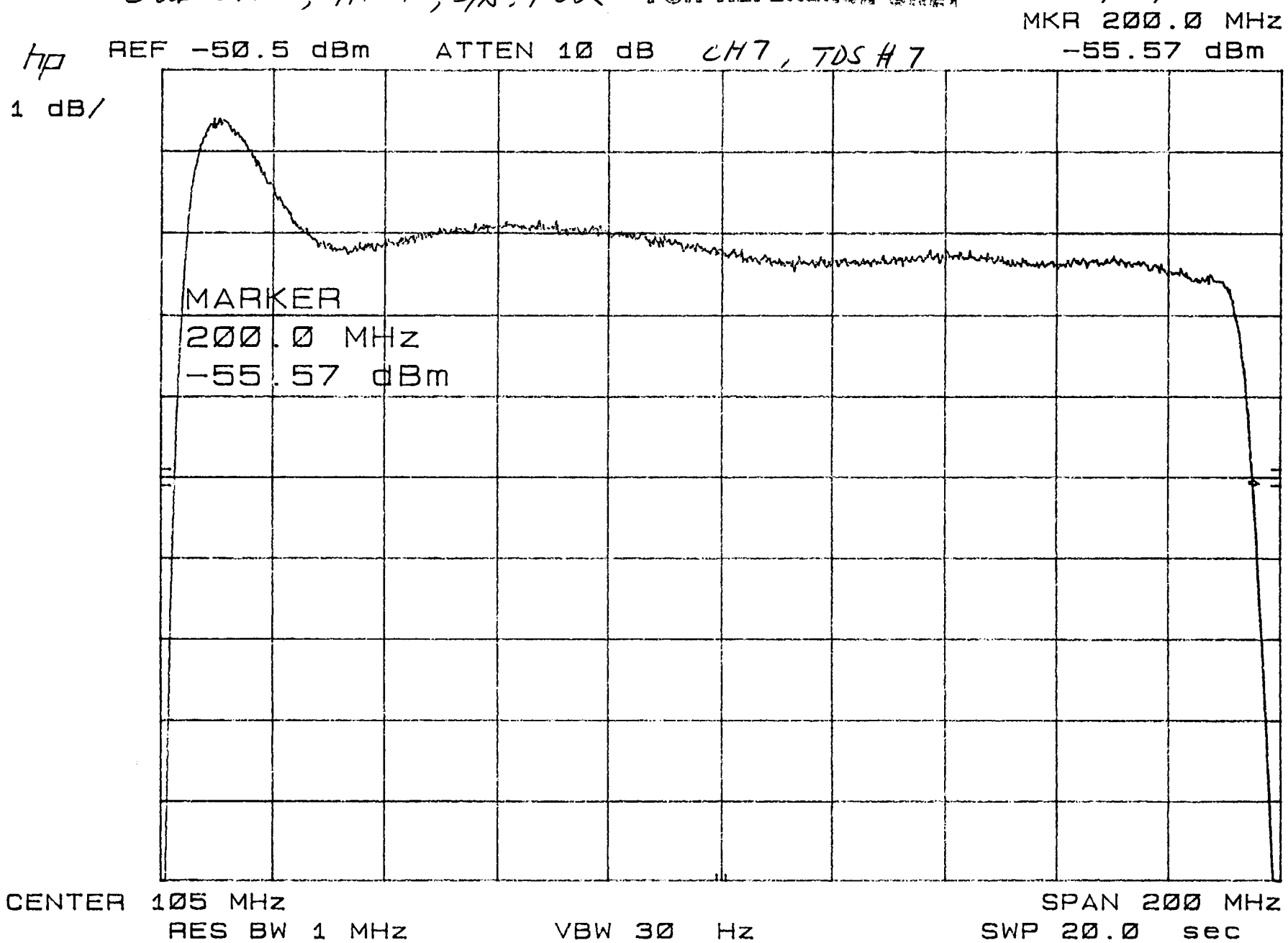
40 dB BPF, A1-1, S/N: F02 **FOR REFERENCE ONLY** 8/12/98



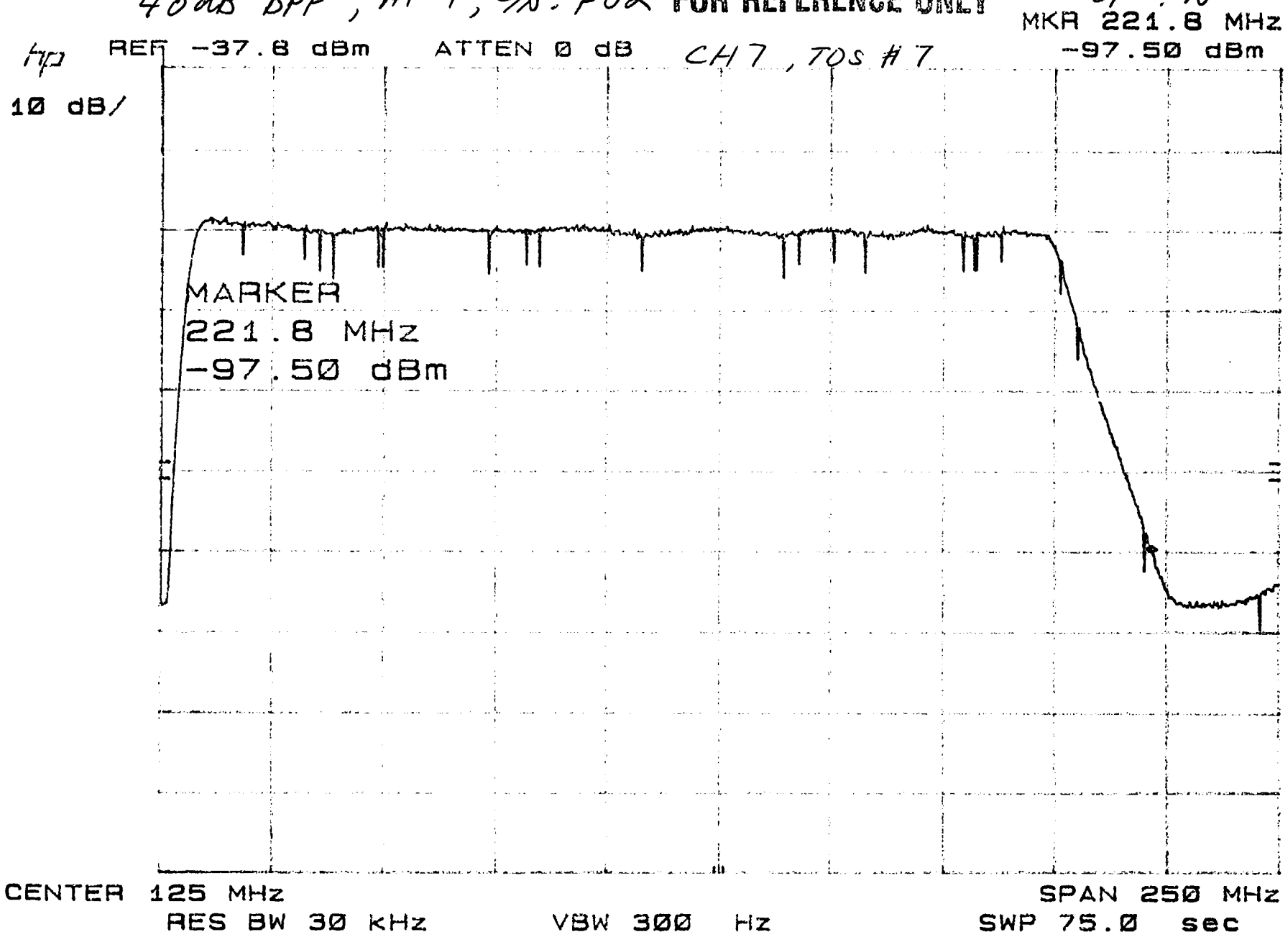
STOP BAND , A1-1 , S/N: 102 **FOR REFERENCE ONLY** 8/. 1/98



3 dB BPF , A1-1 , S/N: F02 FOR REFERENCE ONLY 8/12/98



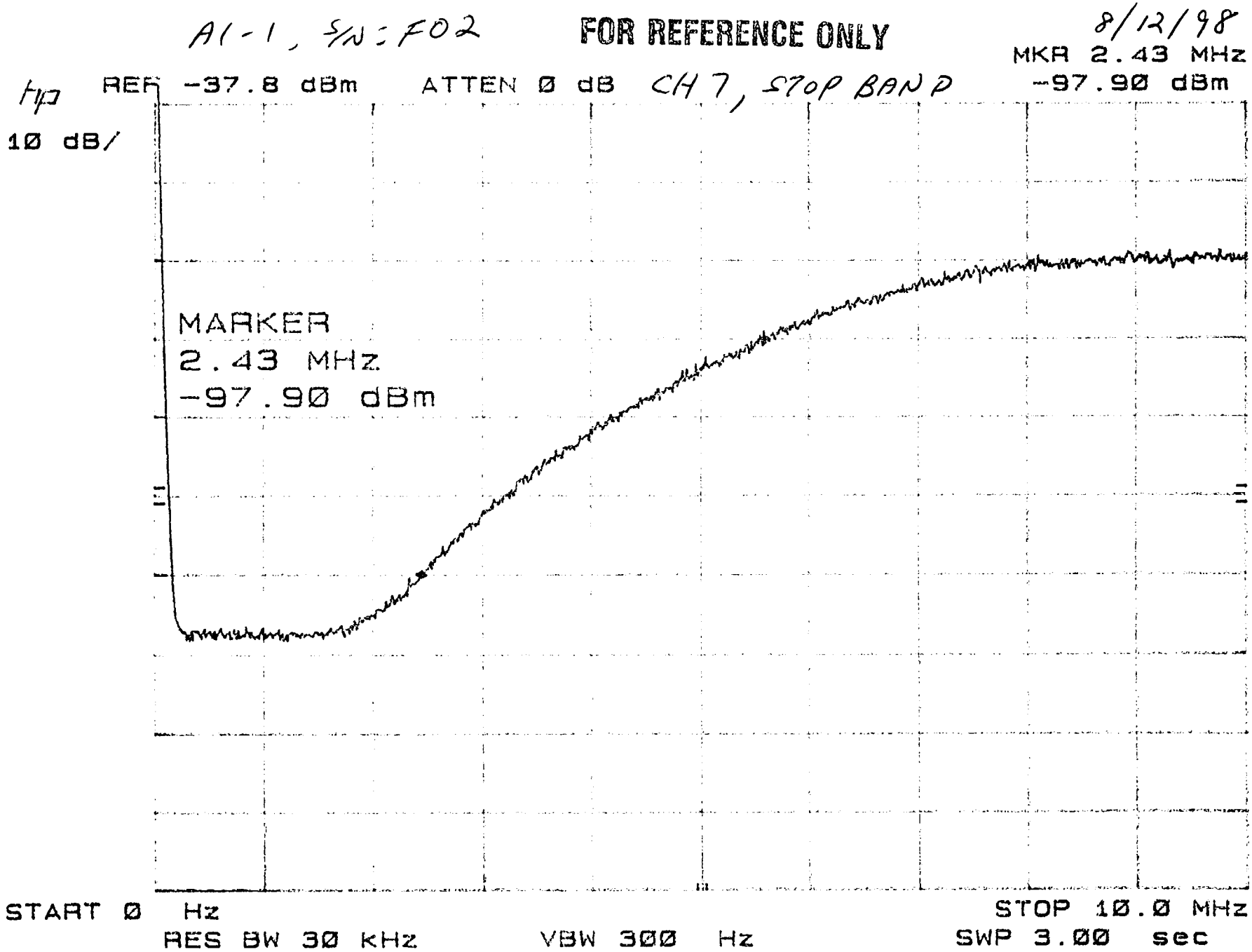
40dB BPF, A1-1, S/N: 002 FOR REFERENCE ONLY 8/1/98



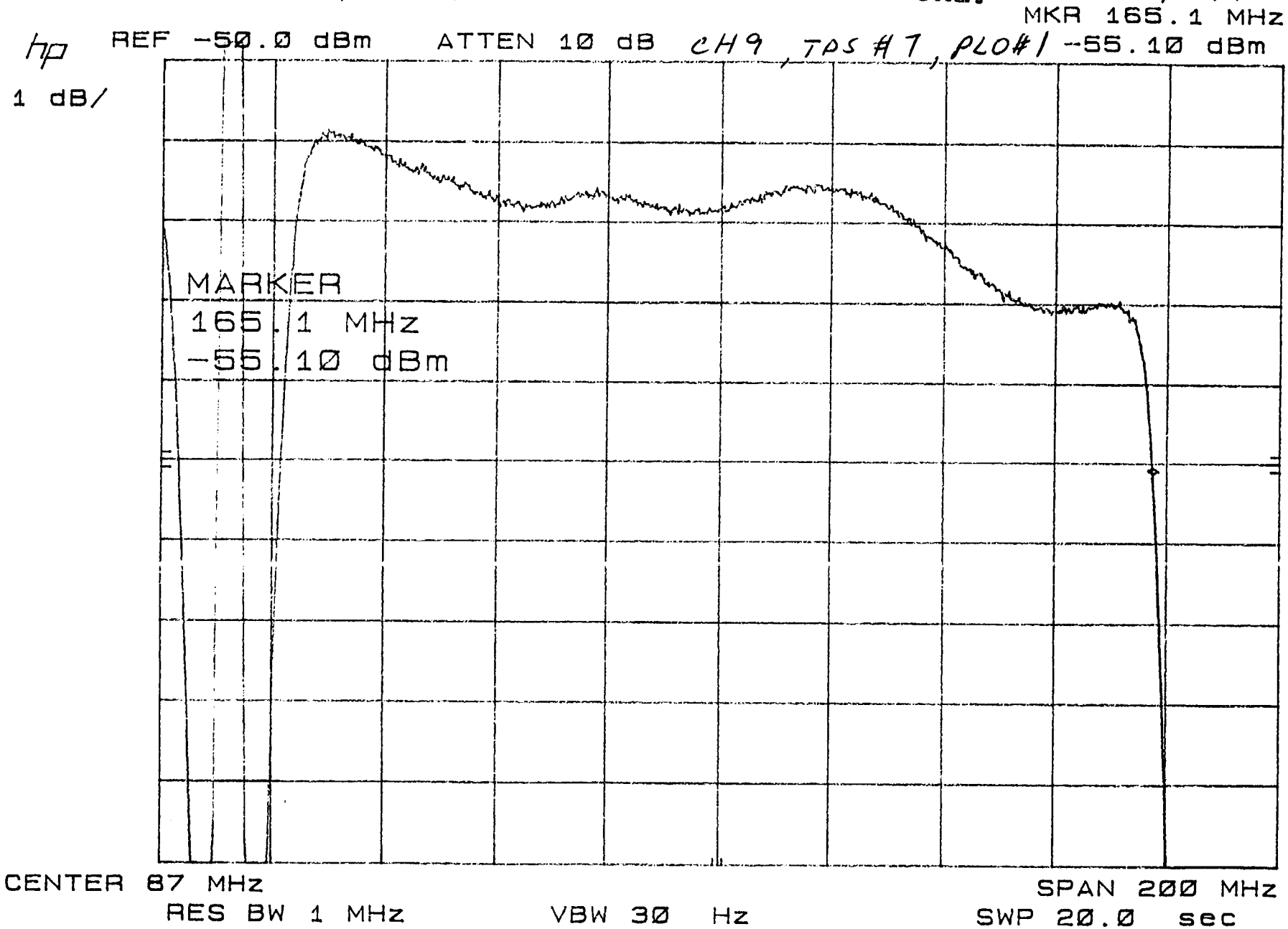
A1-1, S/N: F02

FOR REFERENCE ONLY

8/12/98

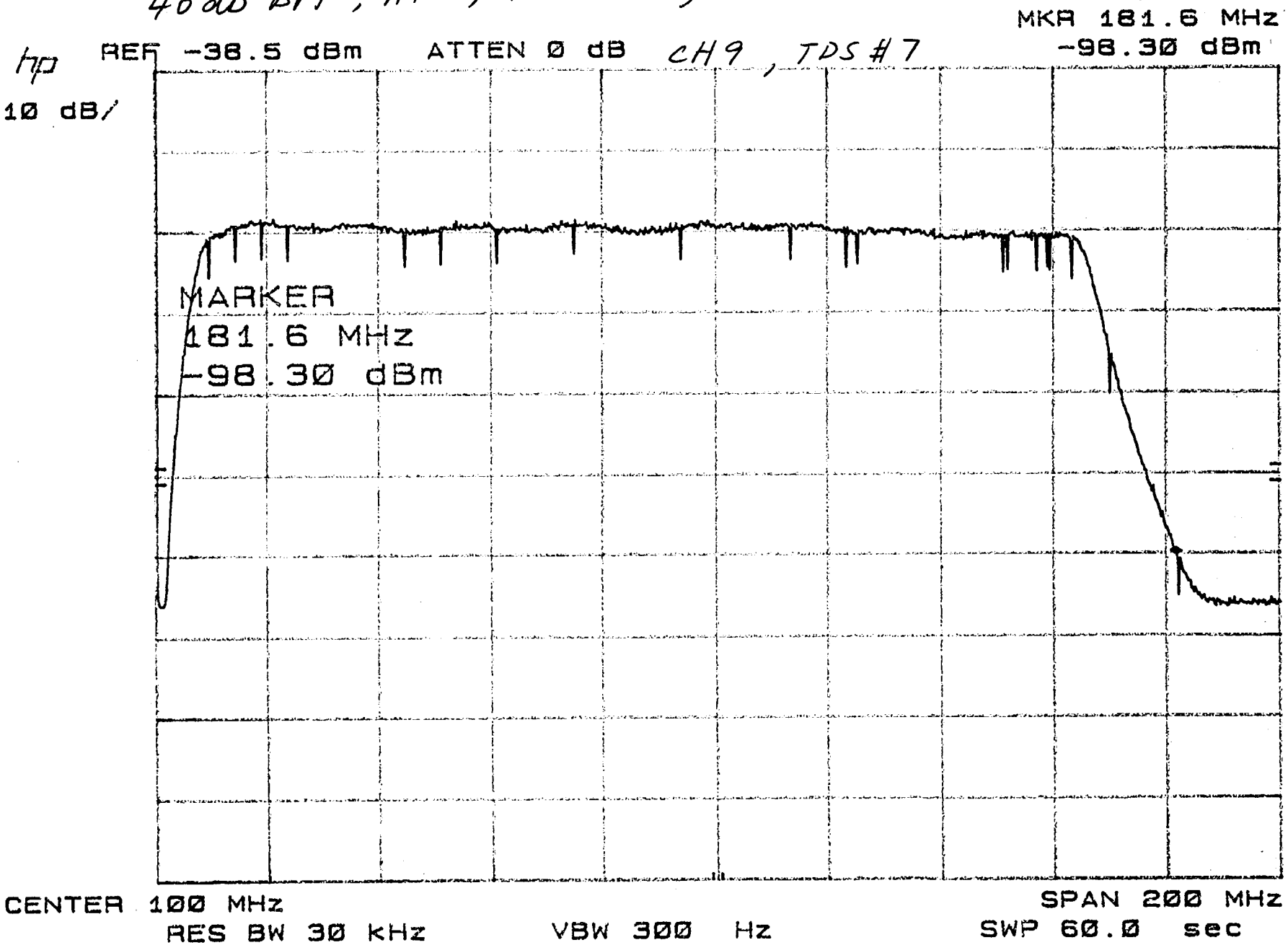


3dB BPF, A1-1, S/N: F02 **FOR REFERENCE ONLY** 8/12/98

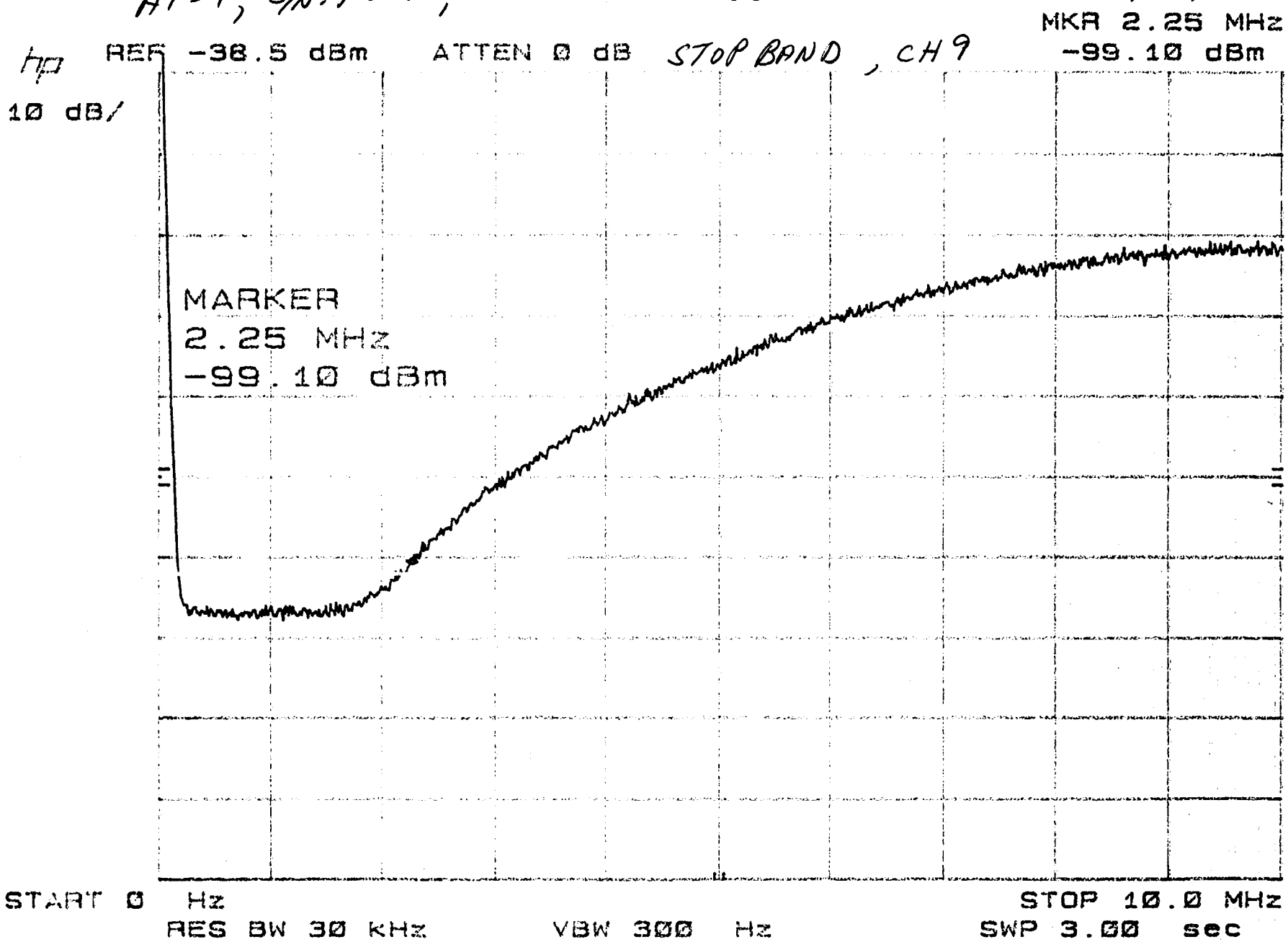


FOR REFERENCE ONLY

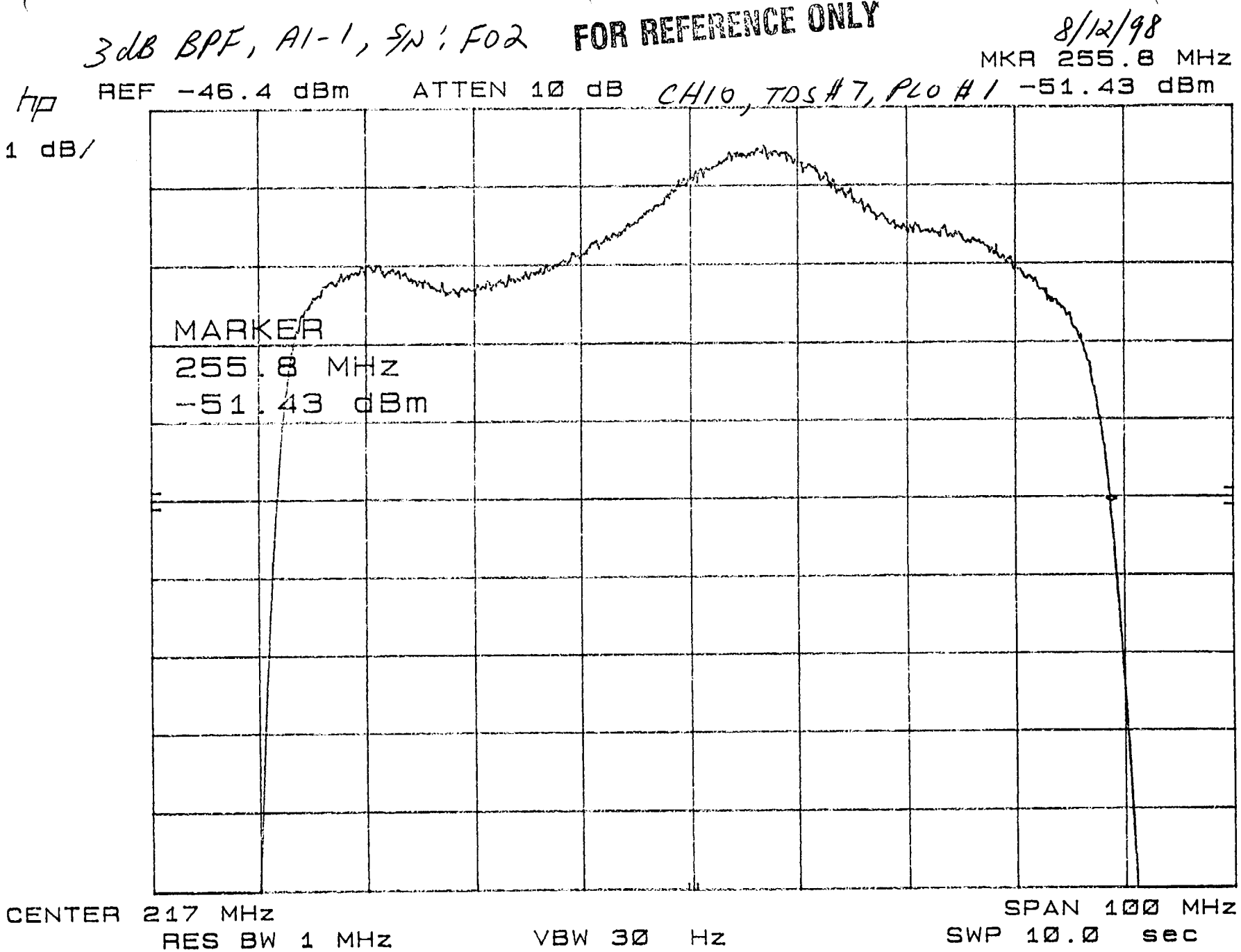
40 dB BPF, A1-1, S/N: F02, PLO #1 8/12/98



A1-1, S/N: F02, PLO #1 FOR REFERENCE ONLY 8/12/98

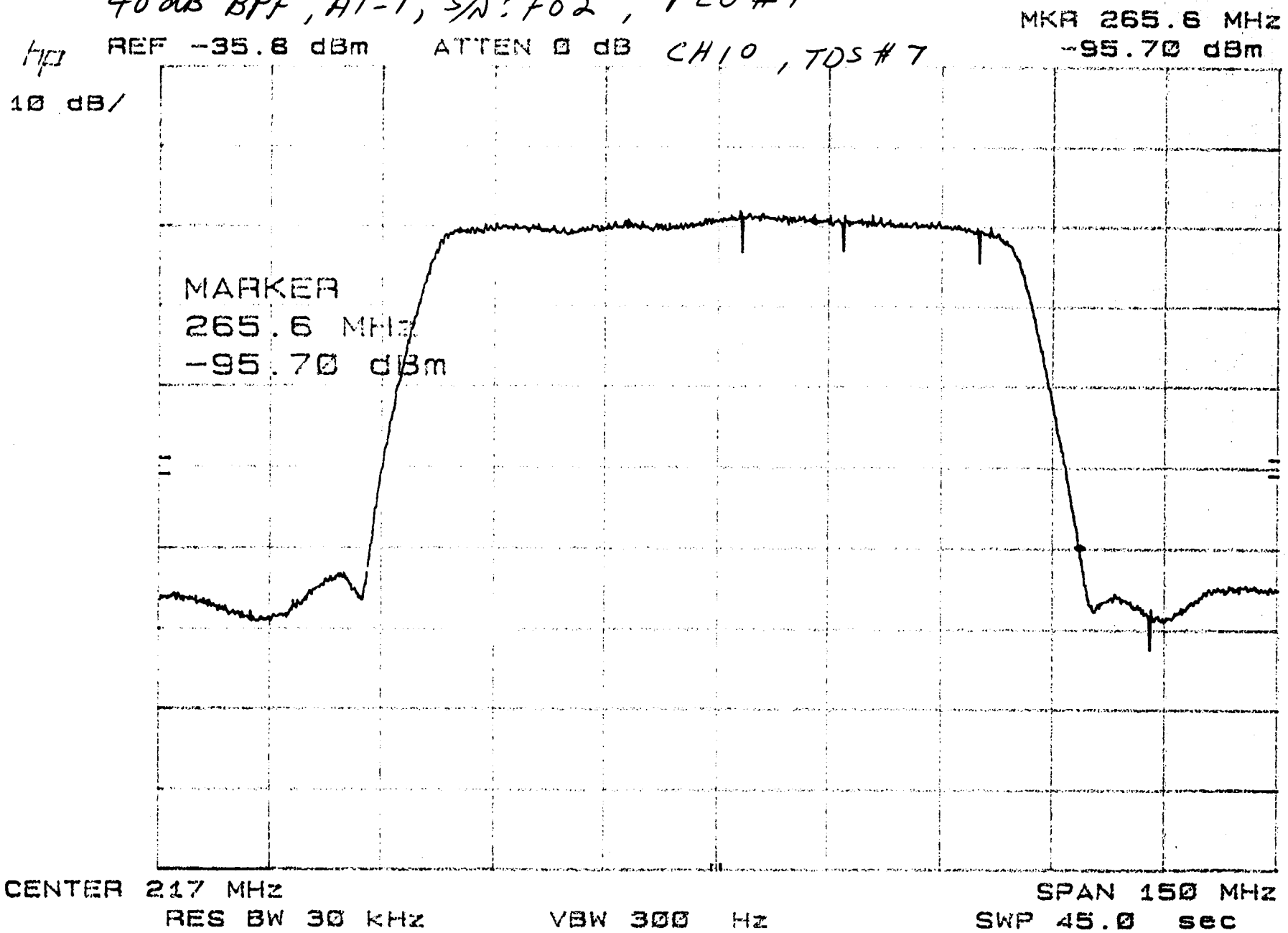


3dB BPF, A1-1, S/N: F02 FOR REFERENCE ONLY 8/12/98

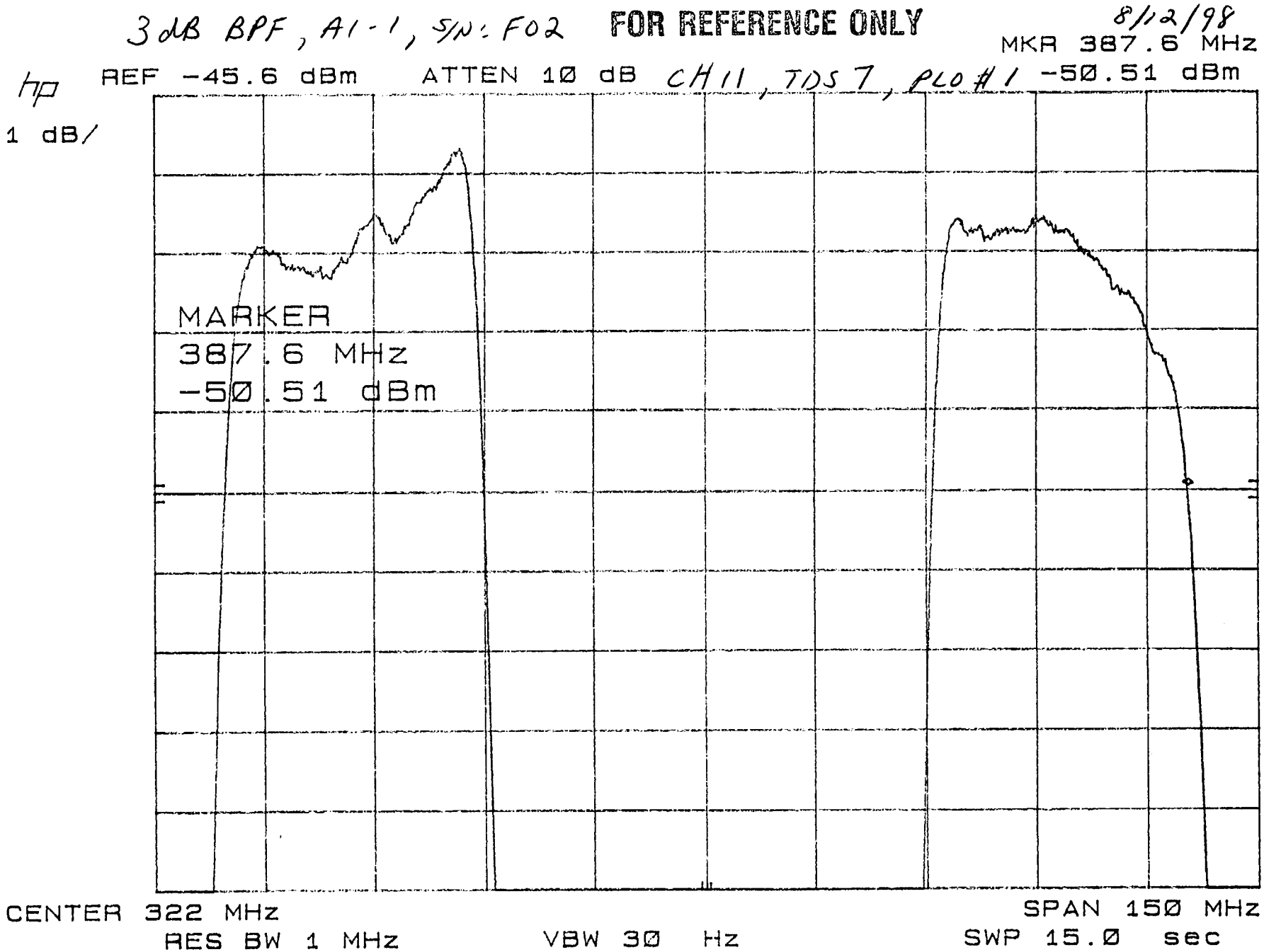


FOR REFERENCE ONLY 8/12/98

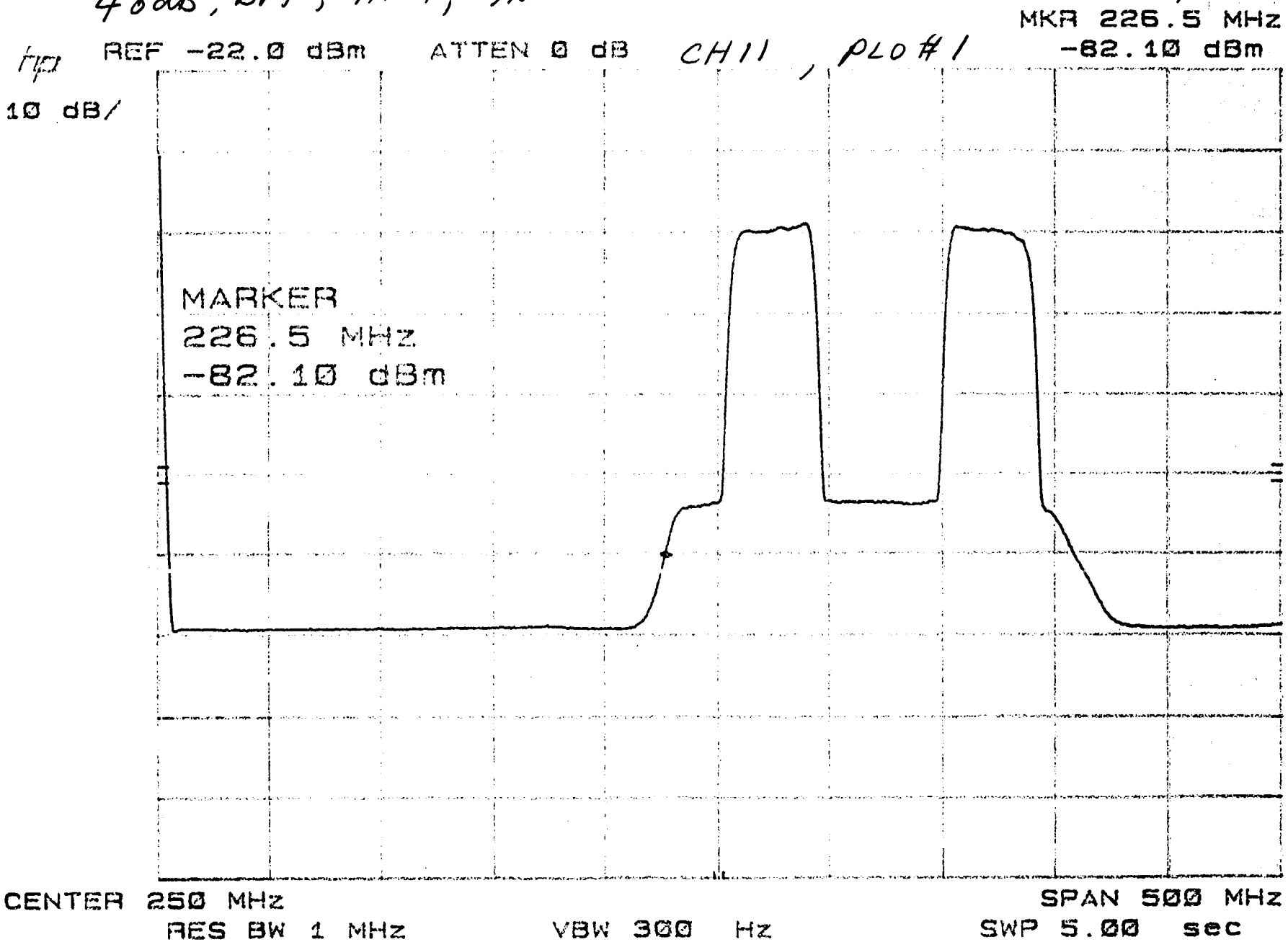
40 dB BPF, A1-1, S/N: F02, PLO #1



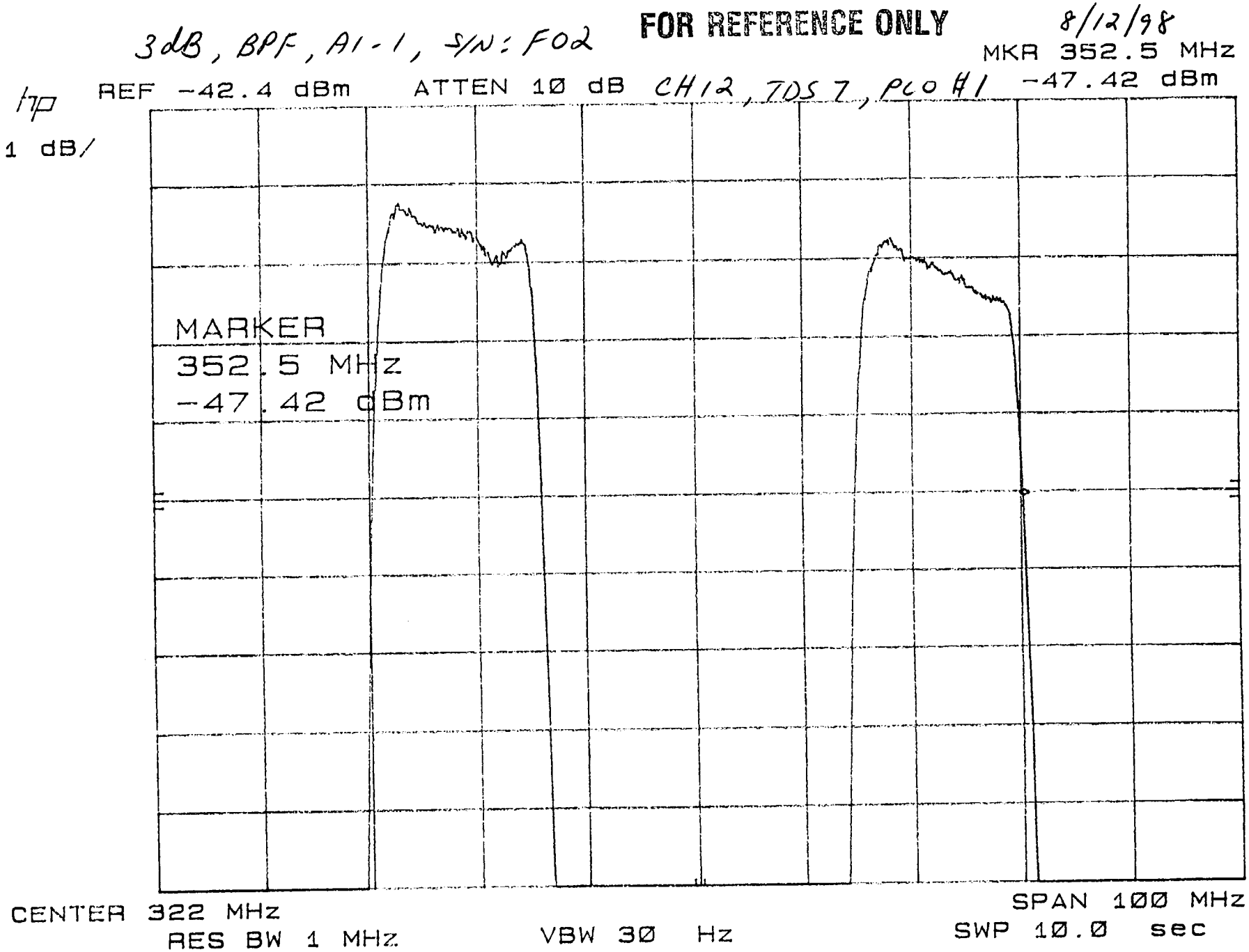
3dB BPF, A1-1, S/N: F02 **FOR REFERENCE ONLY** 8/12/98



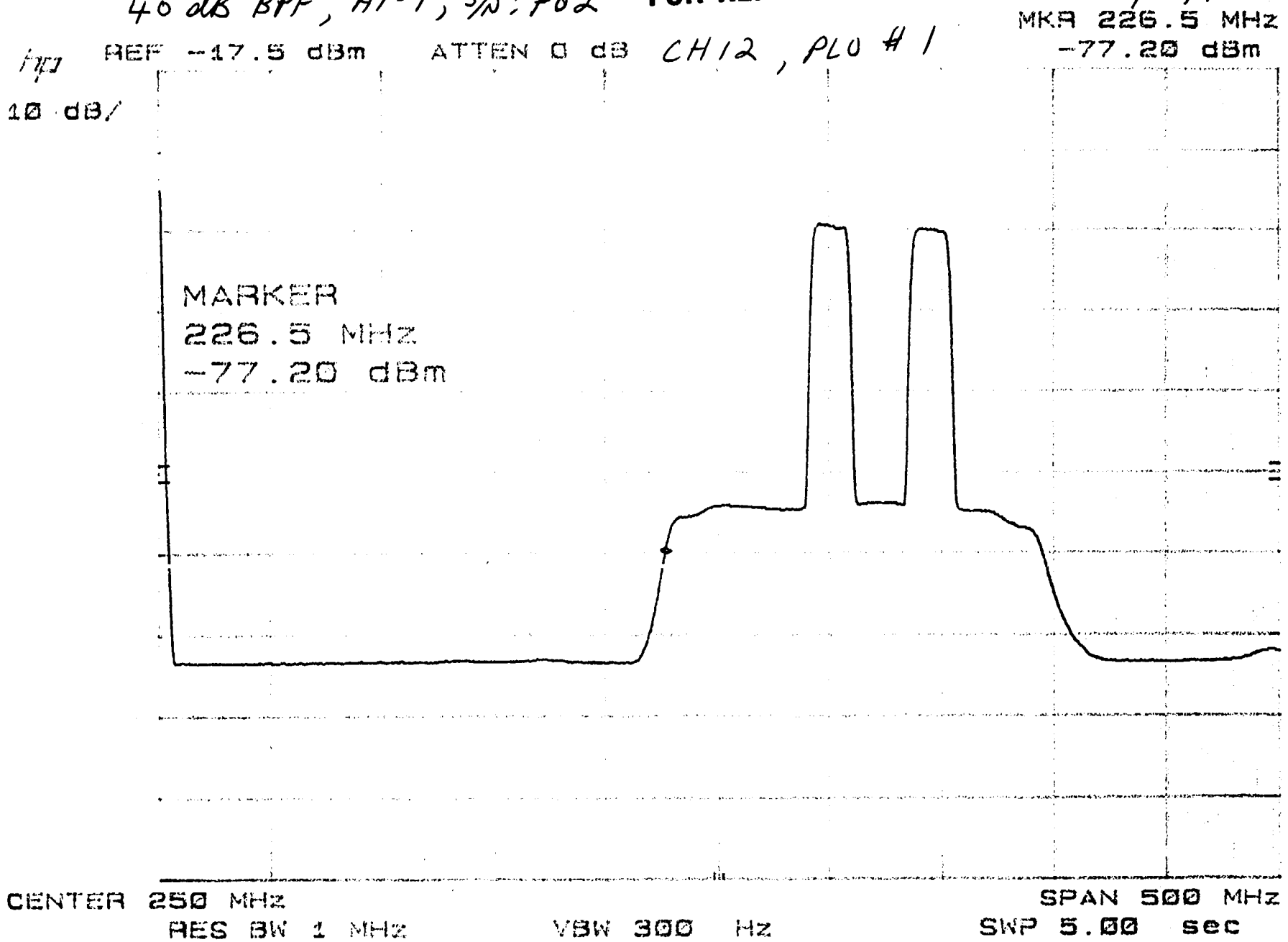
40dB, BPF, A1-1, S/N: F02 **FOR REFERENCE ONLY** 8/12/98



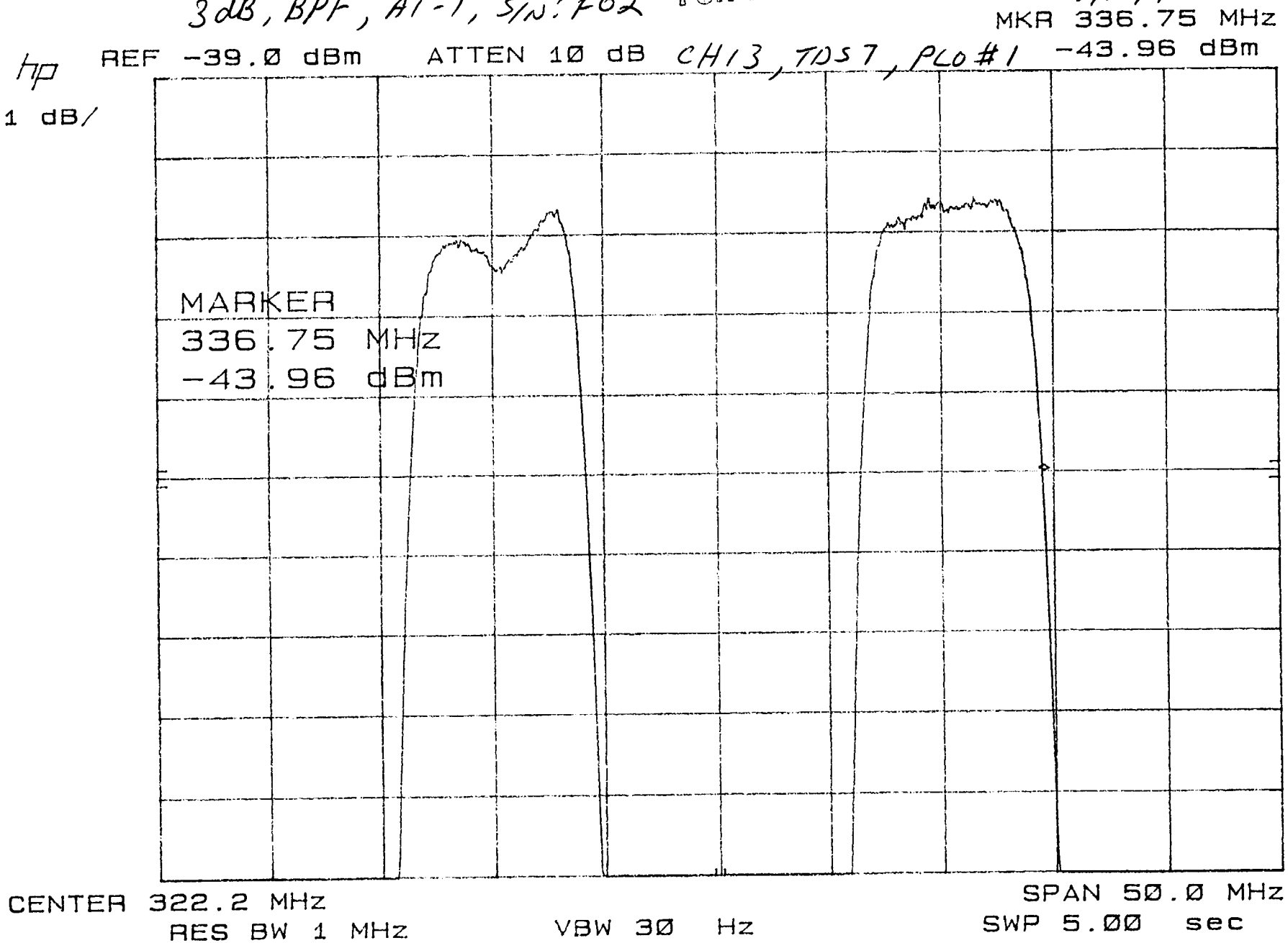
3dB, BPF, A1-1, S/N: F02 **FOR REFERENCE ONLY** 8/12/98



40 dB BPF, A1-1, S/N: F02 **FOR REFERENCE ONLY** 8/12/98



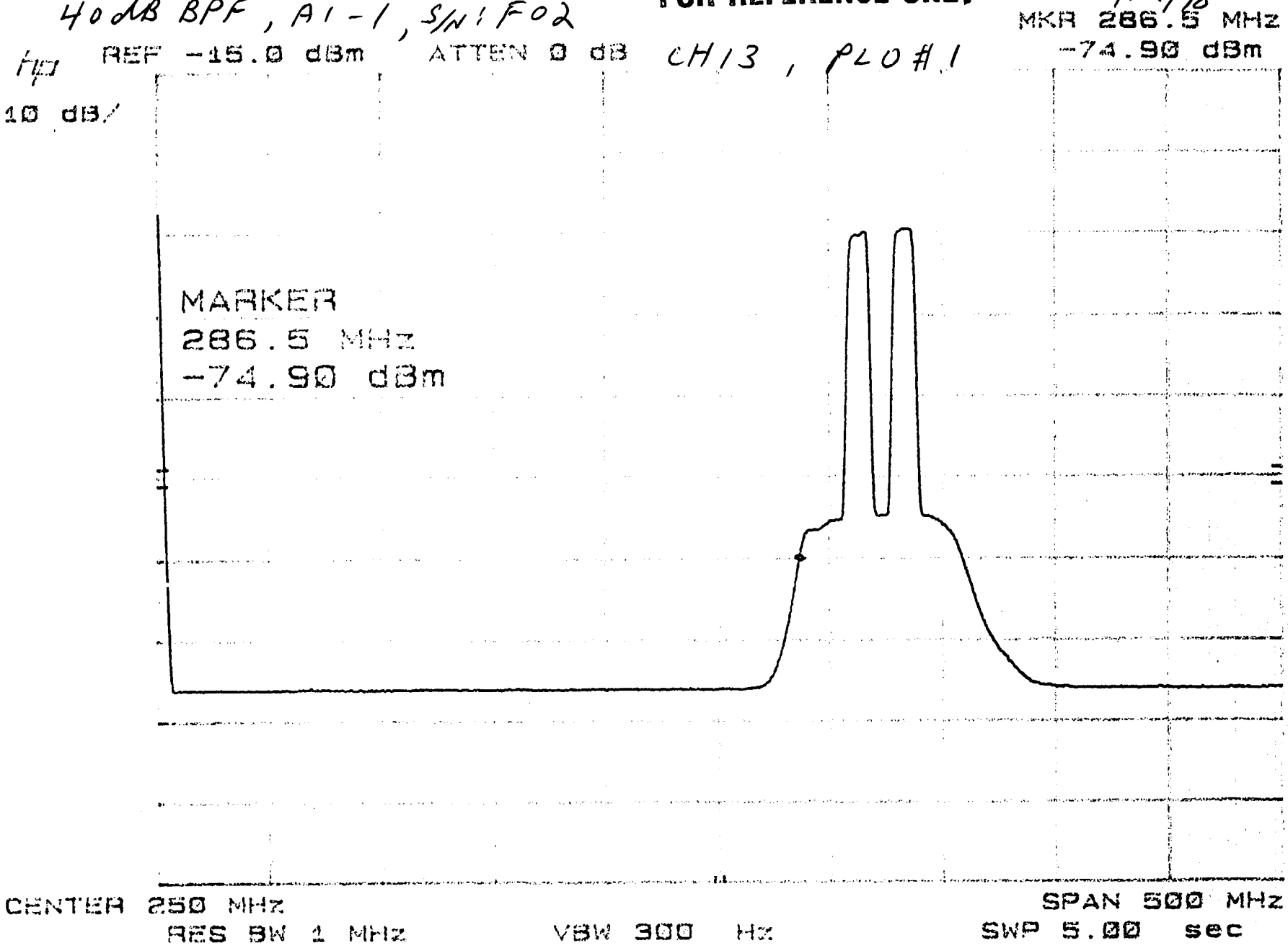
3dB, BPF, A1-1, S/N: F02 FOR REFERENCE ONLY 8/12/98



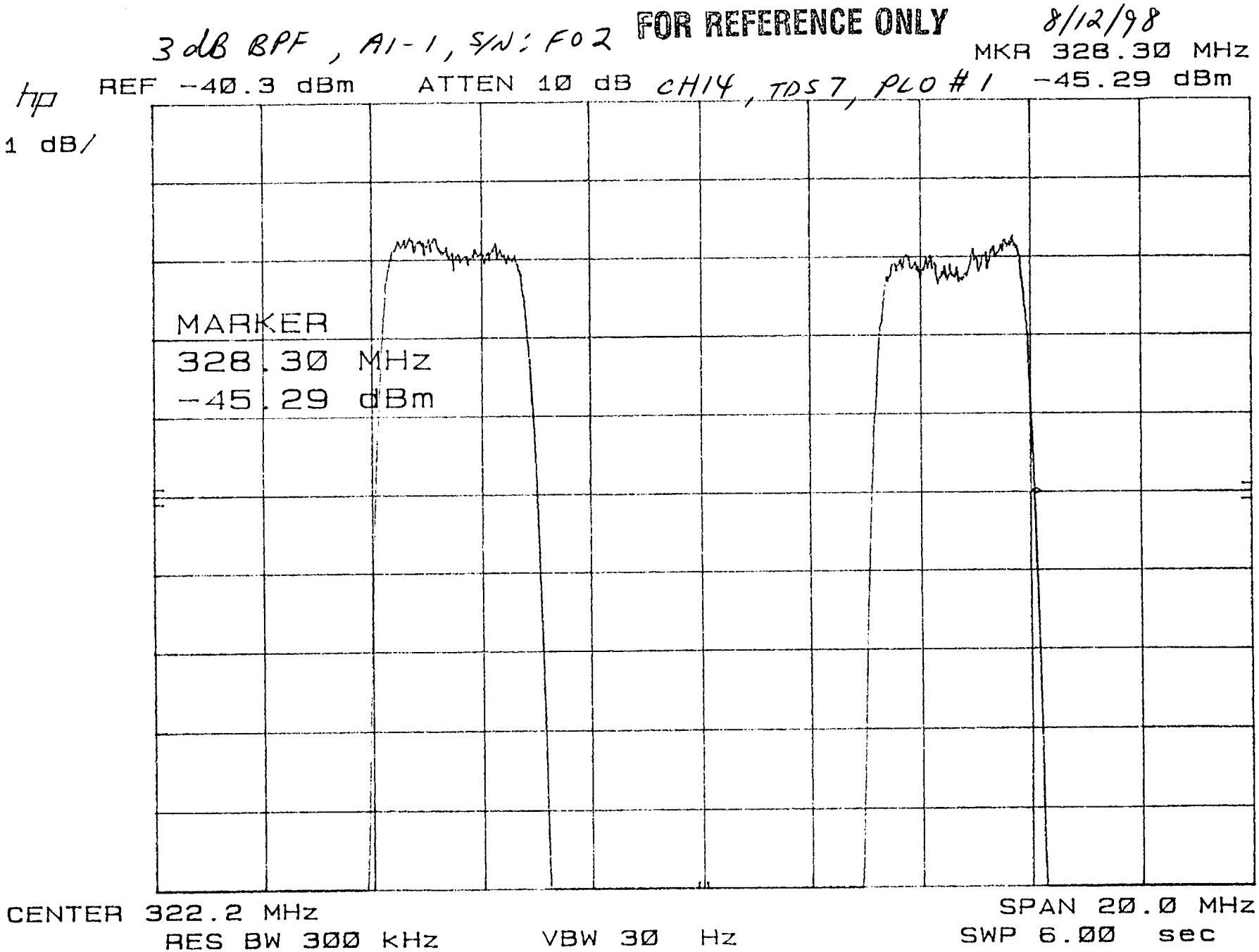
40dB BPF, A1-1, S/N: F02

FOR REFERENCE ONLY

8/12/98



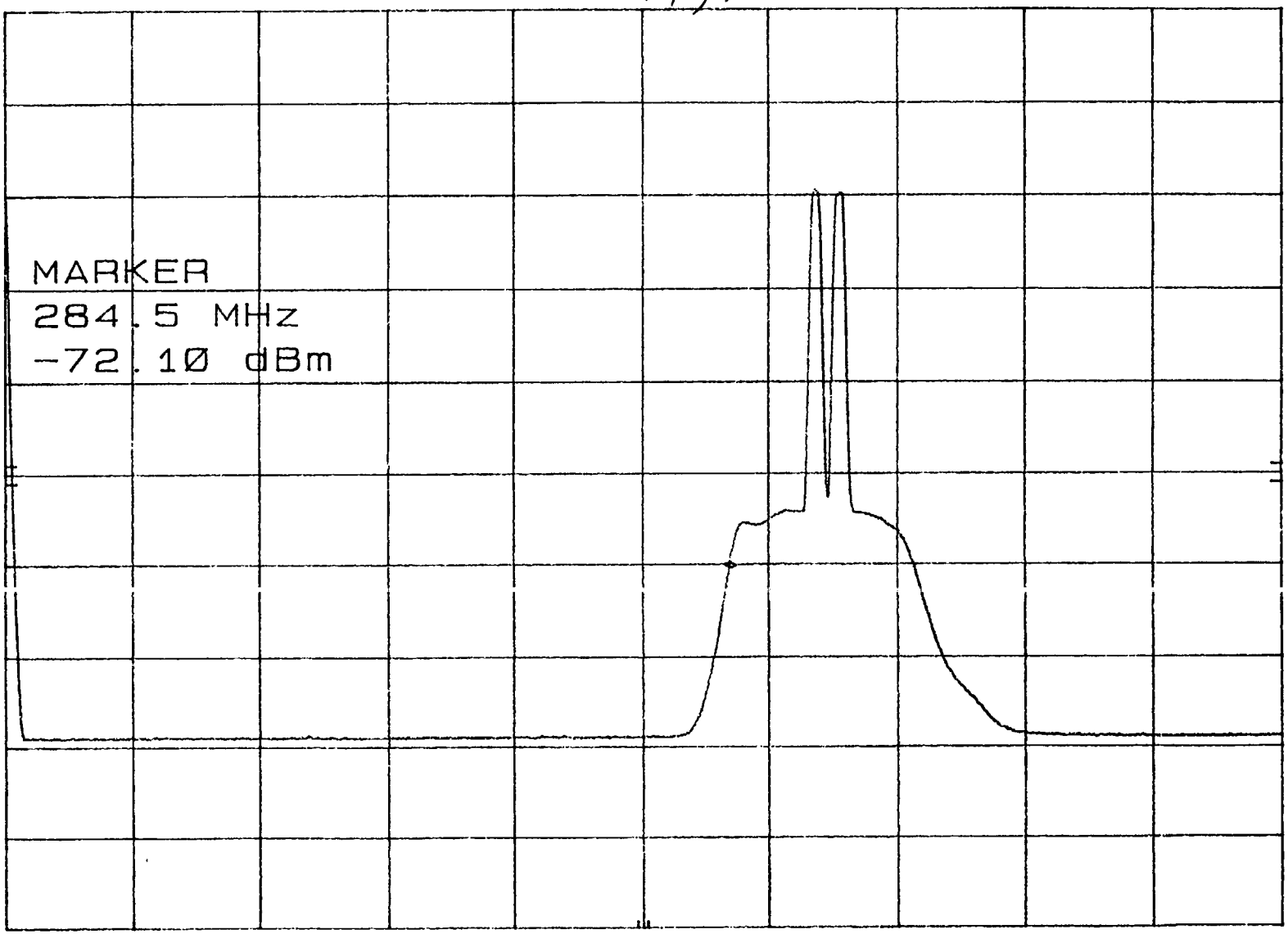
3 dB BPF, A1-1, S/N: F02 FOR REFERENCE ONLY 8/12/98



40 dB BPF, A1-1, S/N: F02 **FOR REFERENCE ONLY** 8/12/98

hp REF −12.0 dBm ATTEN 0 dB CH14, PLO #1 MKR 284.5 MHz −72.10 dBm

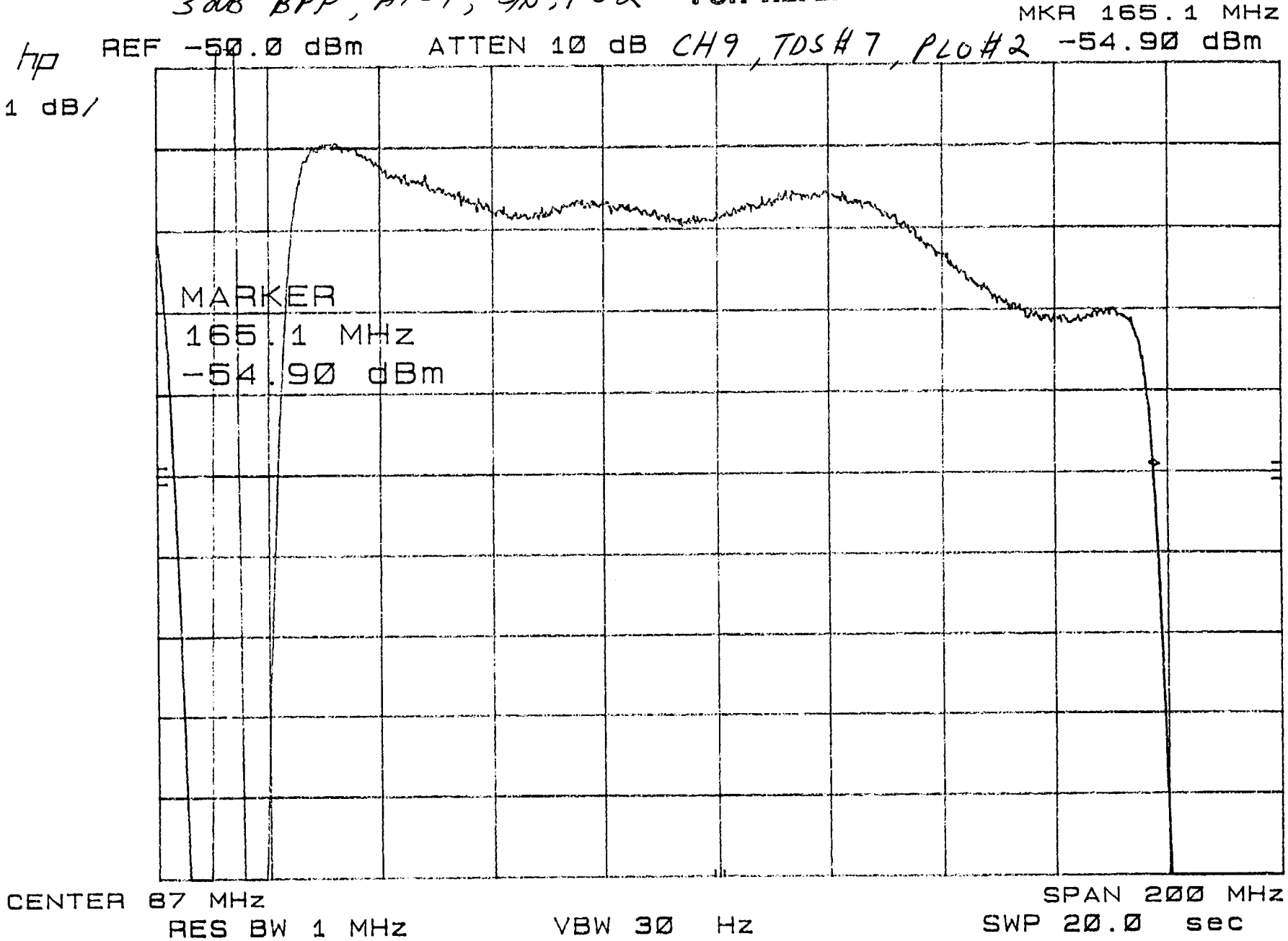
10 dB/



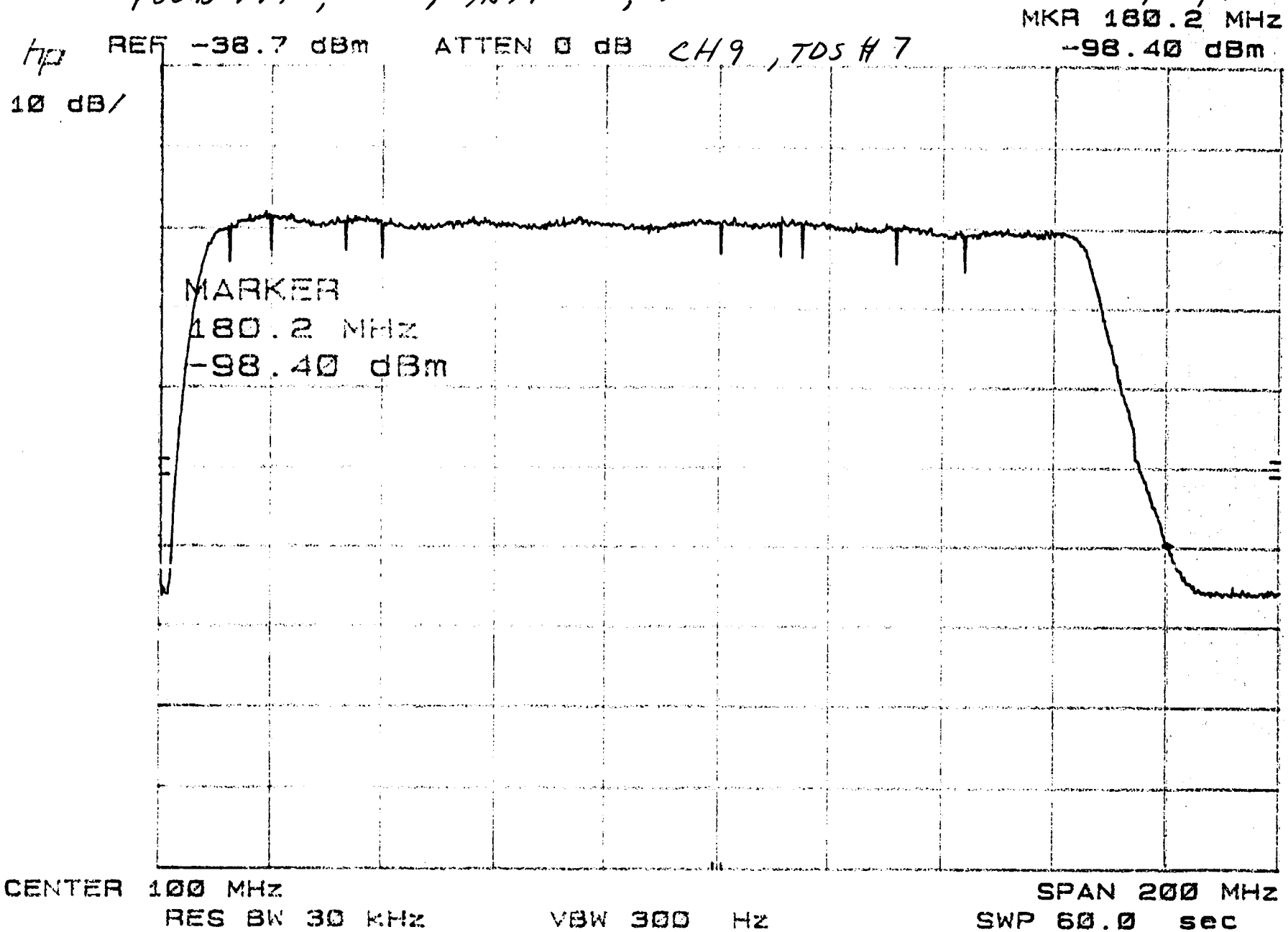
CENTER 250 MHz SPAN 500 MHz

RES BW 1 MHz VBW 300 Hz SWP 5.00 sec

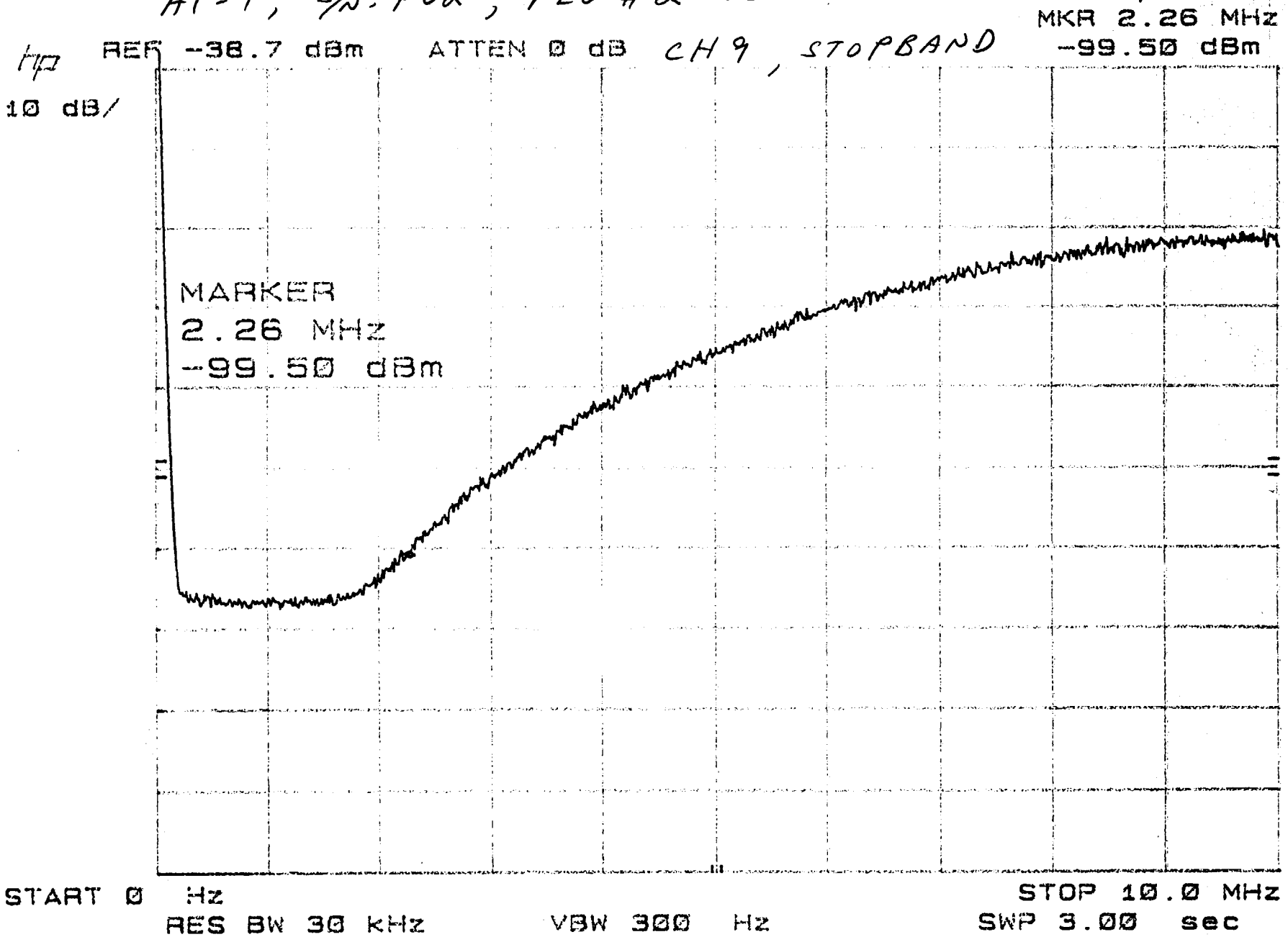
3dB BPF, A1-1, S/N: F02 **FOR REFERENCE ONLY** 8/12/98



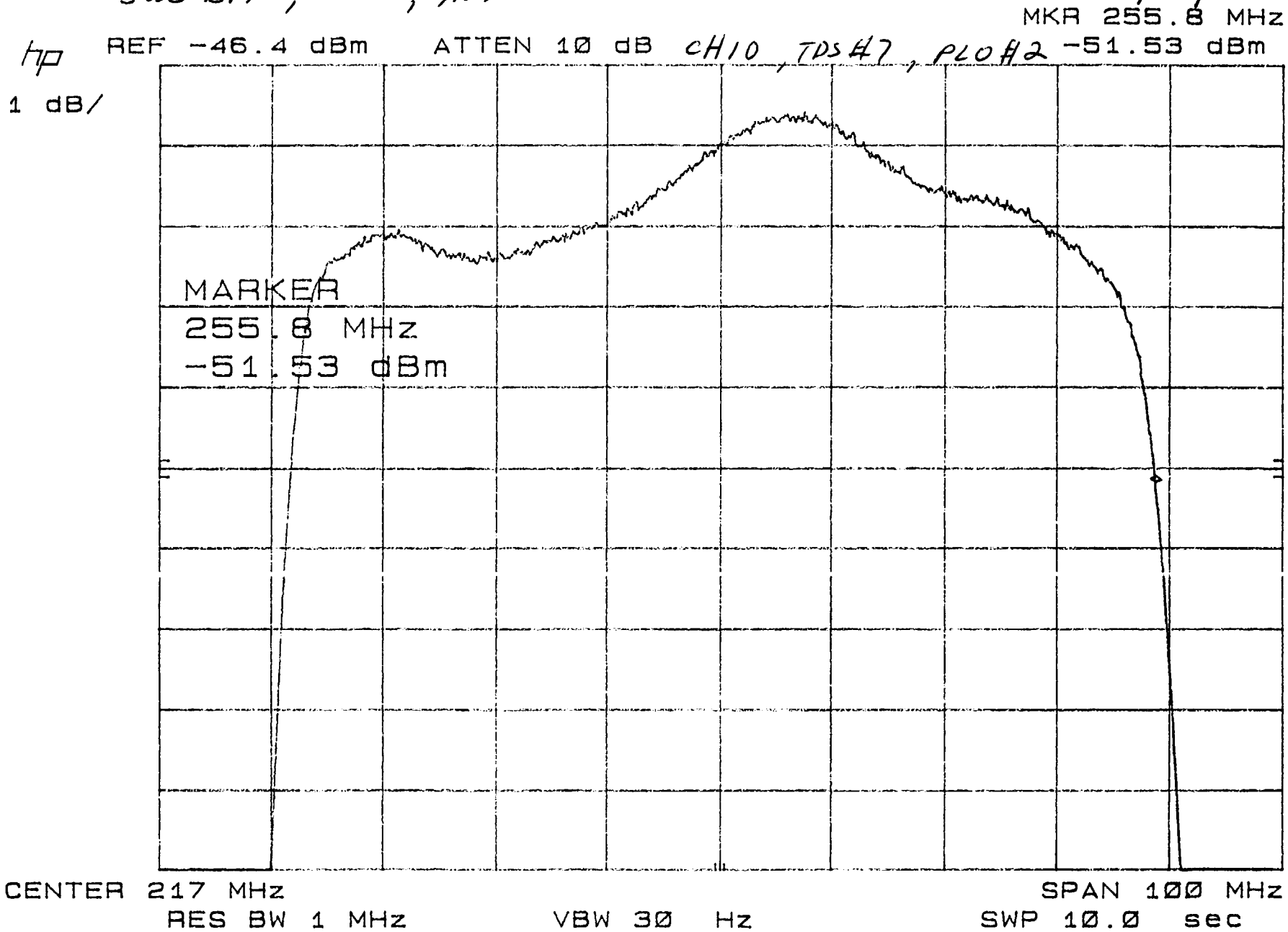
40dB BPF, A1-1, S/N: F02, PLO # 2 FOR REFERENCE ONLY 8/12/98



A1-1, S/N: F02, PLO #2 **FOR REFERENCE ONLY** 8/12/98

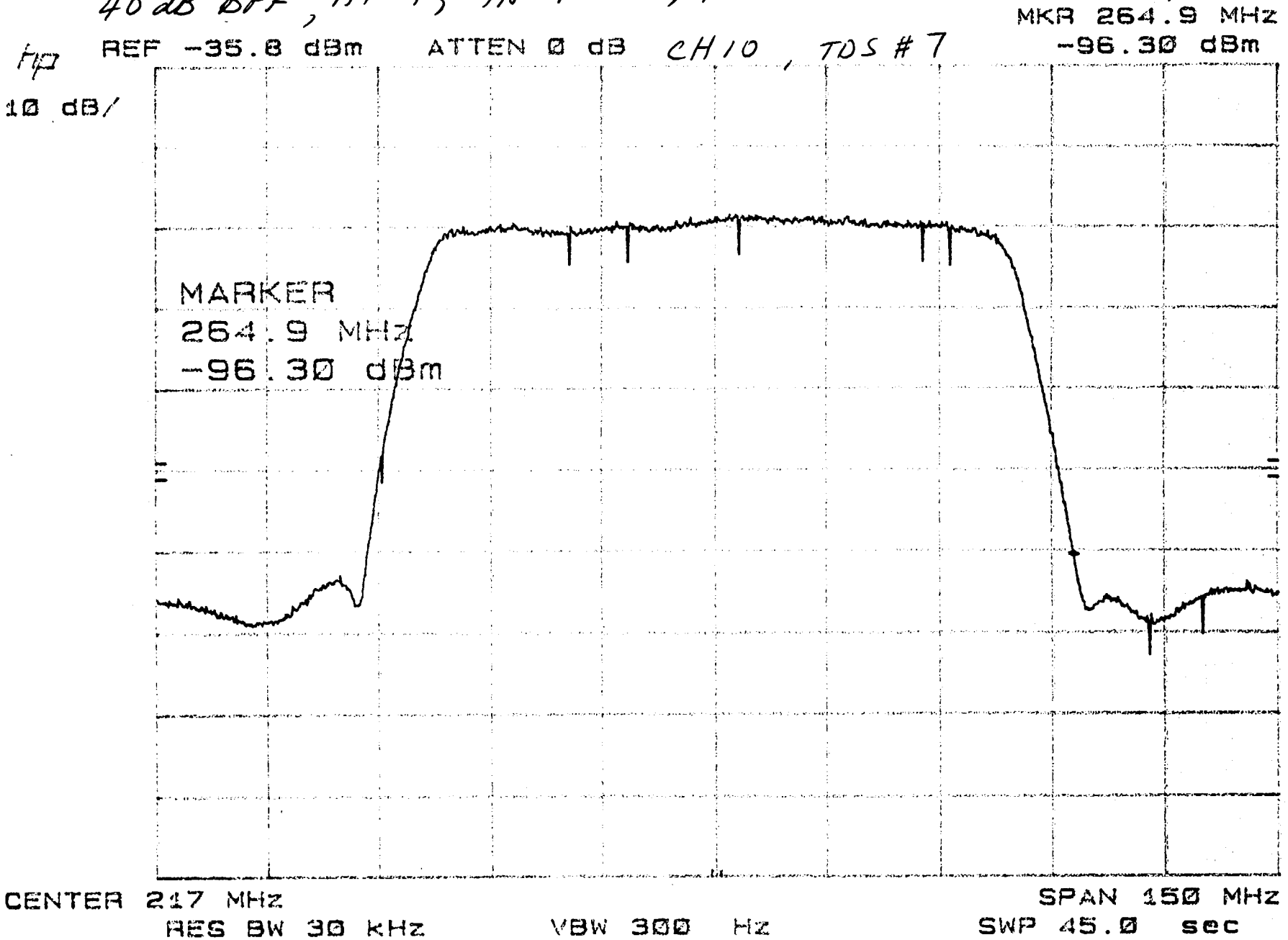


3dB BPF, A1-1, S/N: F02 FOR REFERENCE ONLY 8/12/98



FOR REFERENCE ONLY

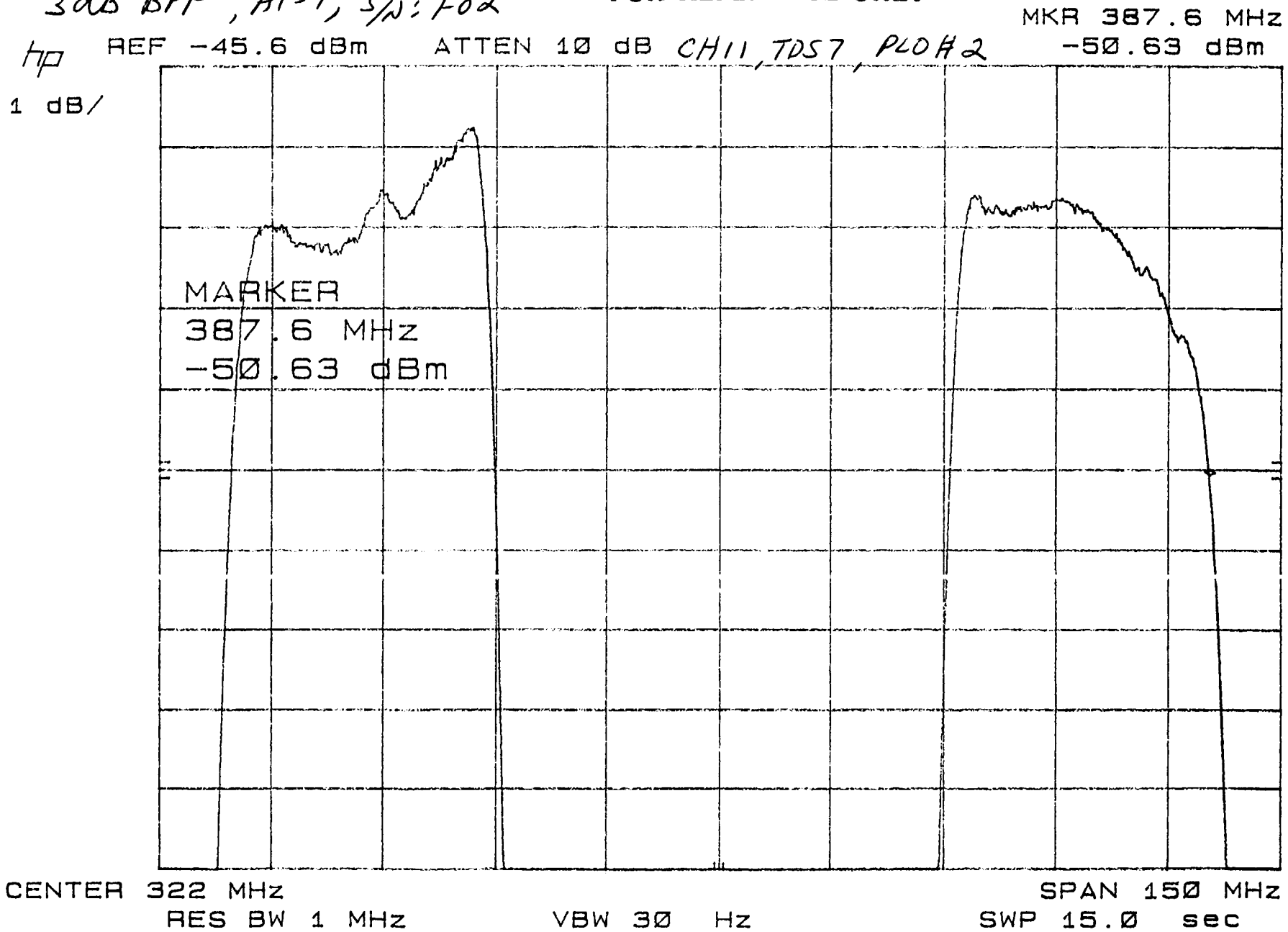
40 dB BPF, A1-1, S/N: F02, PLO #2 8/12/98



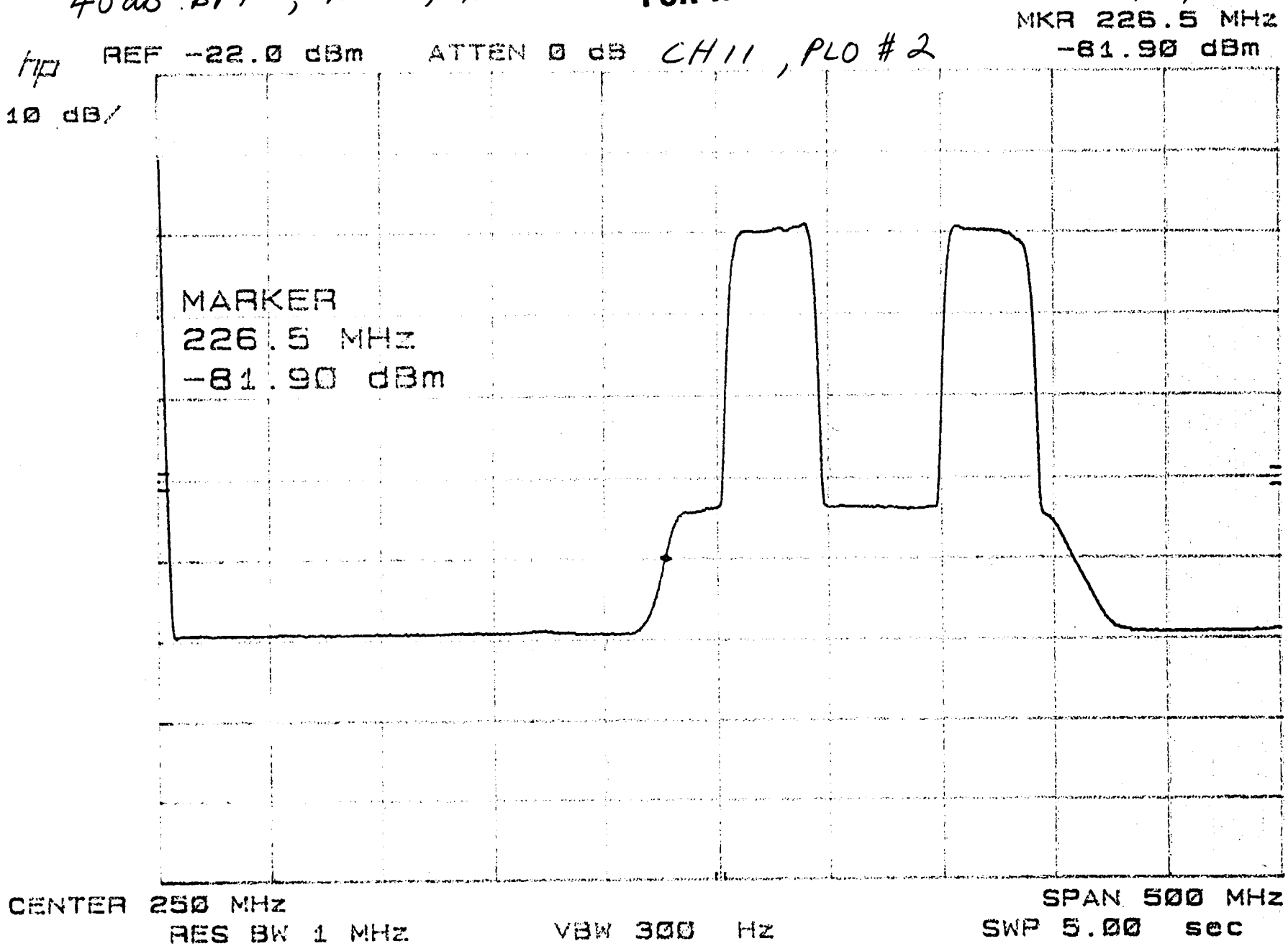
3dB BPF, A1-1, S/N: F02

FOR REFERENCE ONLY

8/12/98



40dB BPF, A1-1, S/N: F02 **FOR REFERENCE ONLY** 8/12/98



3dB, BPF, A1-1, S/N: F02

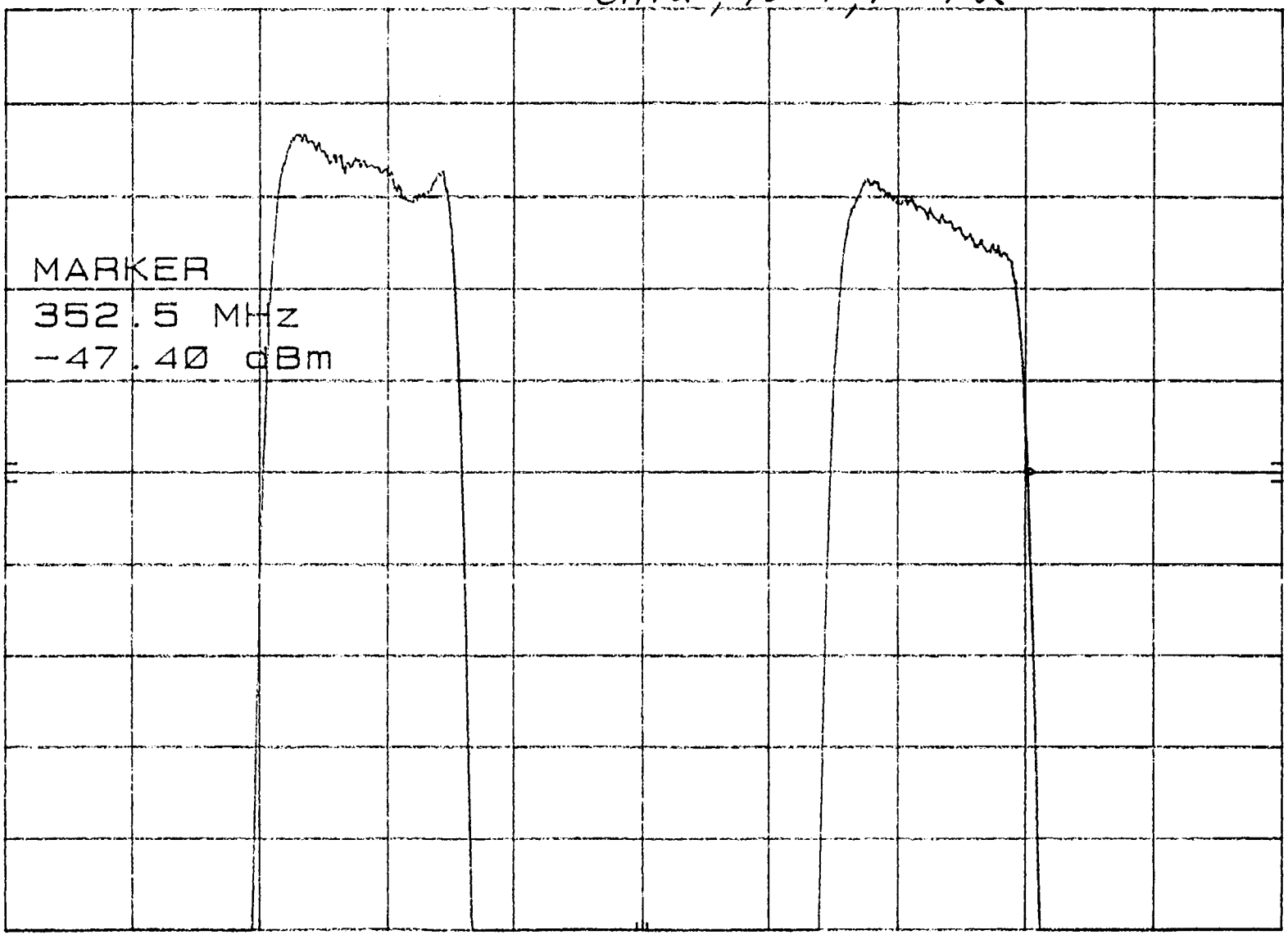
FOR REFERENCE ONLY

8/12/98

MKR 352.5 MHz

hp REF -42.4 dBm ATTEN 10 dB CH12, TDS 7, PLOT #2 -47.40 dBm

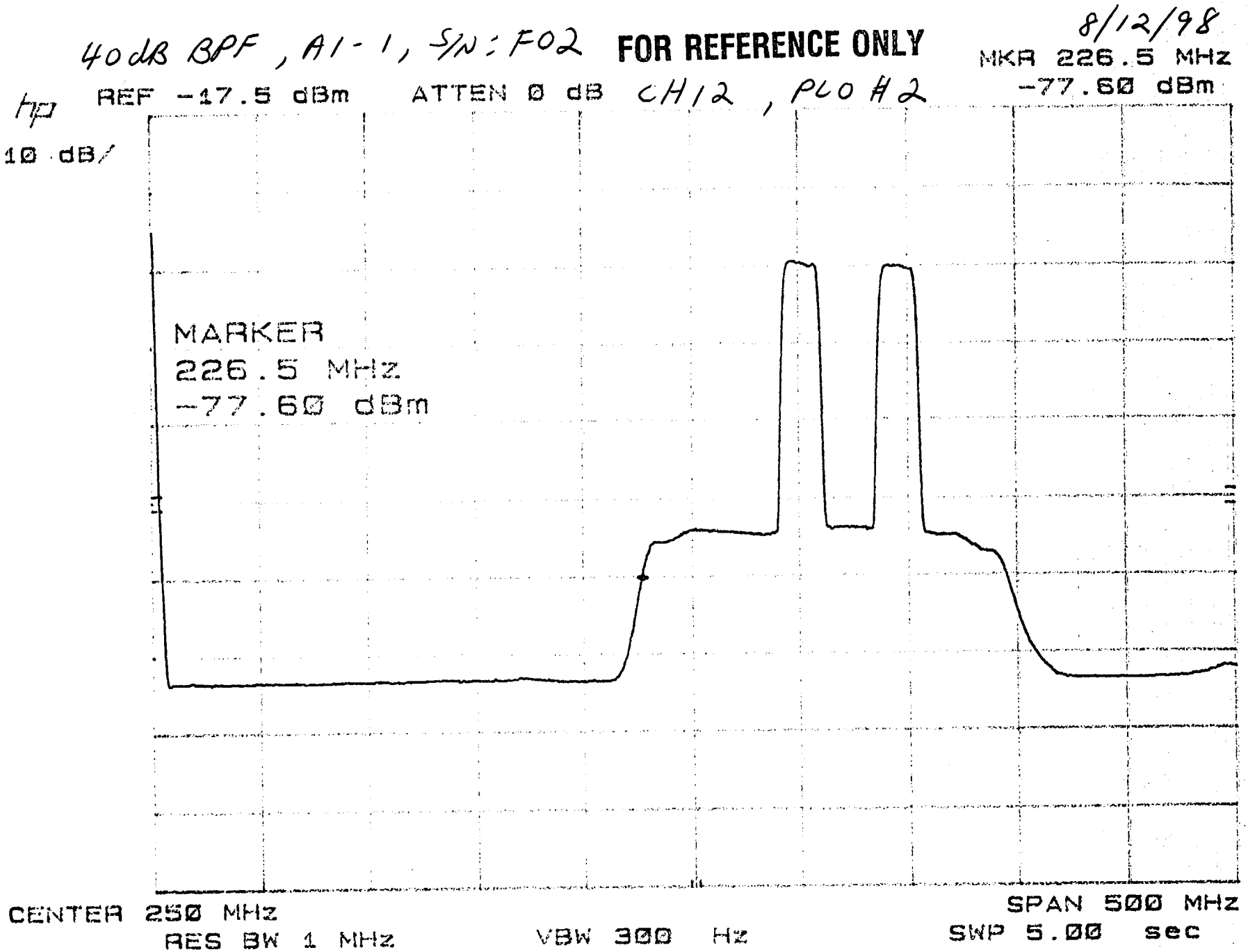
1 dB/



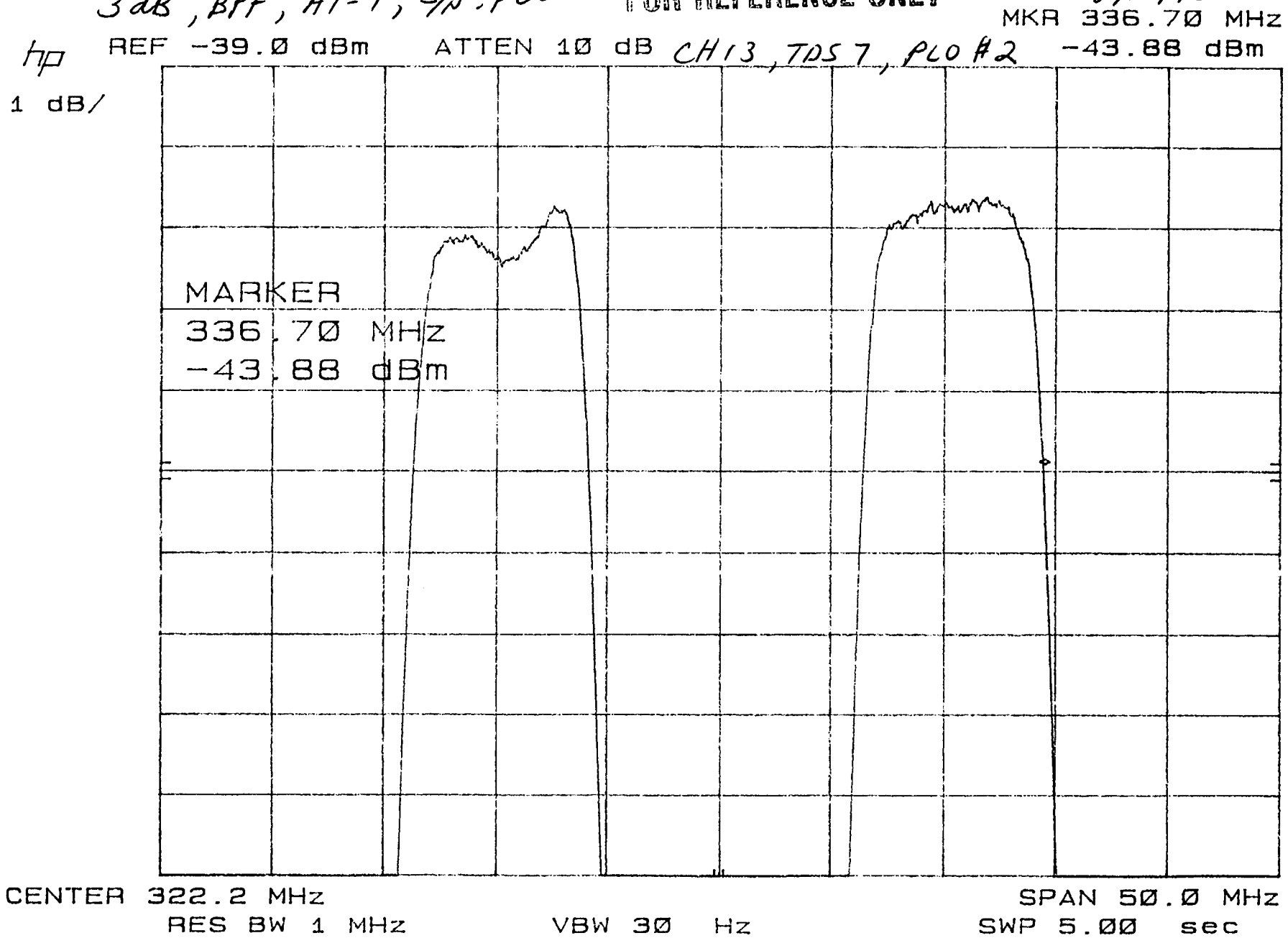
CENTER 322 MHz SPAN 100 MHz

RES BW 1 MHz VBW 30 Hz SWP 10.0 sec

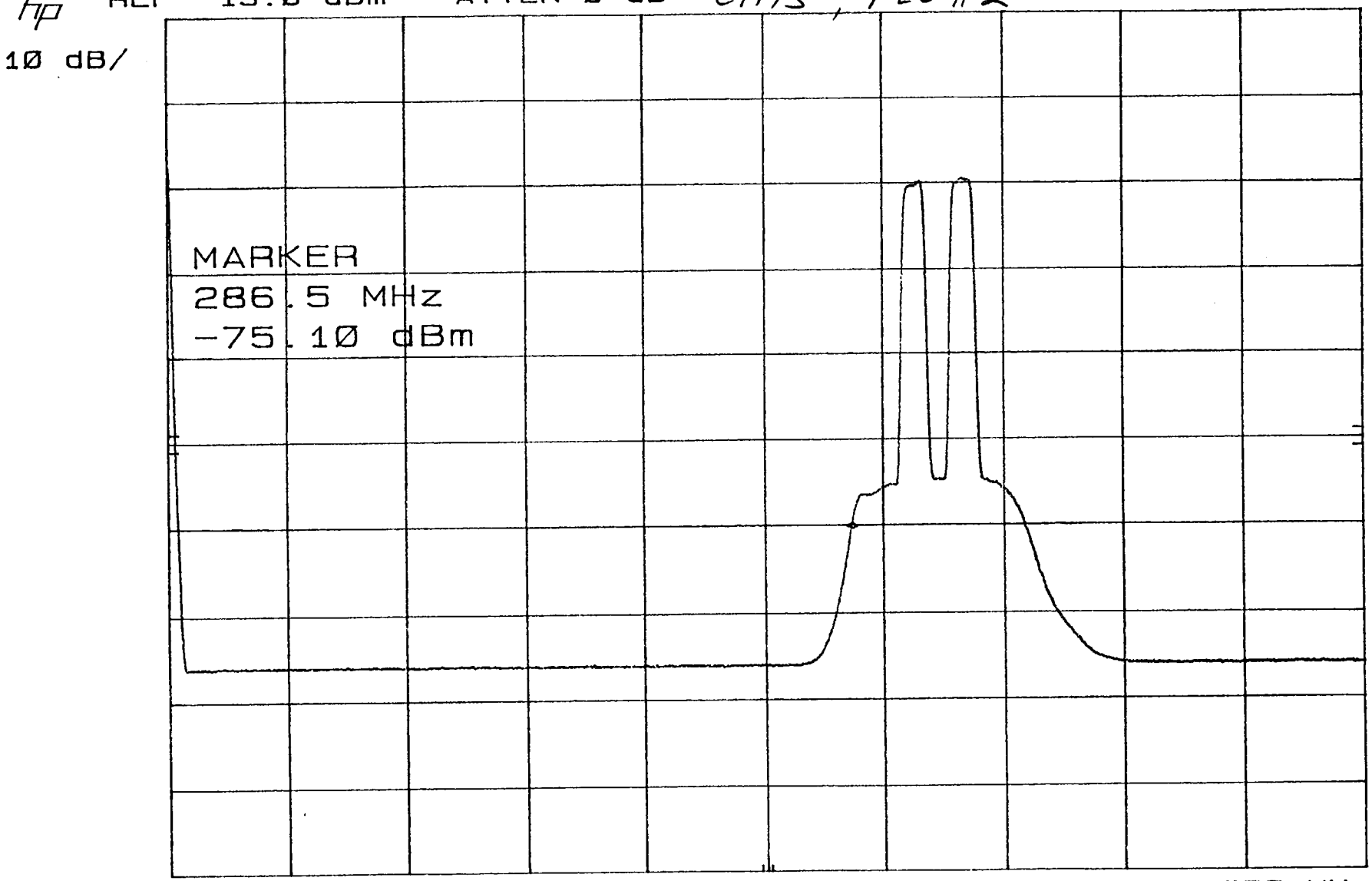
40dB BPF, A1-1, S/N: F02 **FOR REFERENCE ONLY** 8/12/98



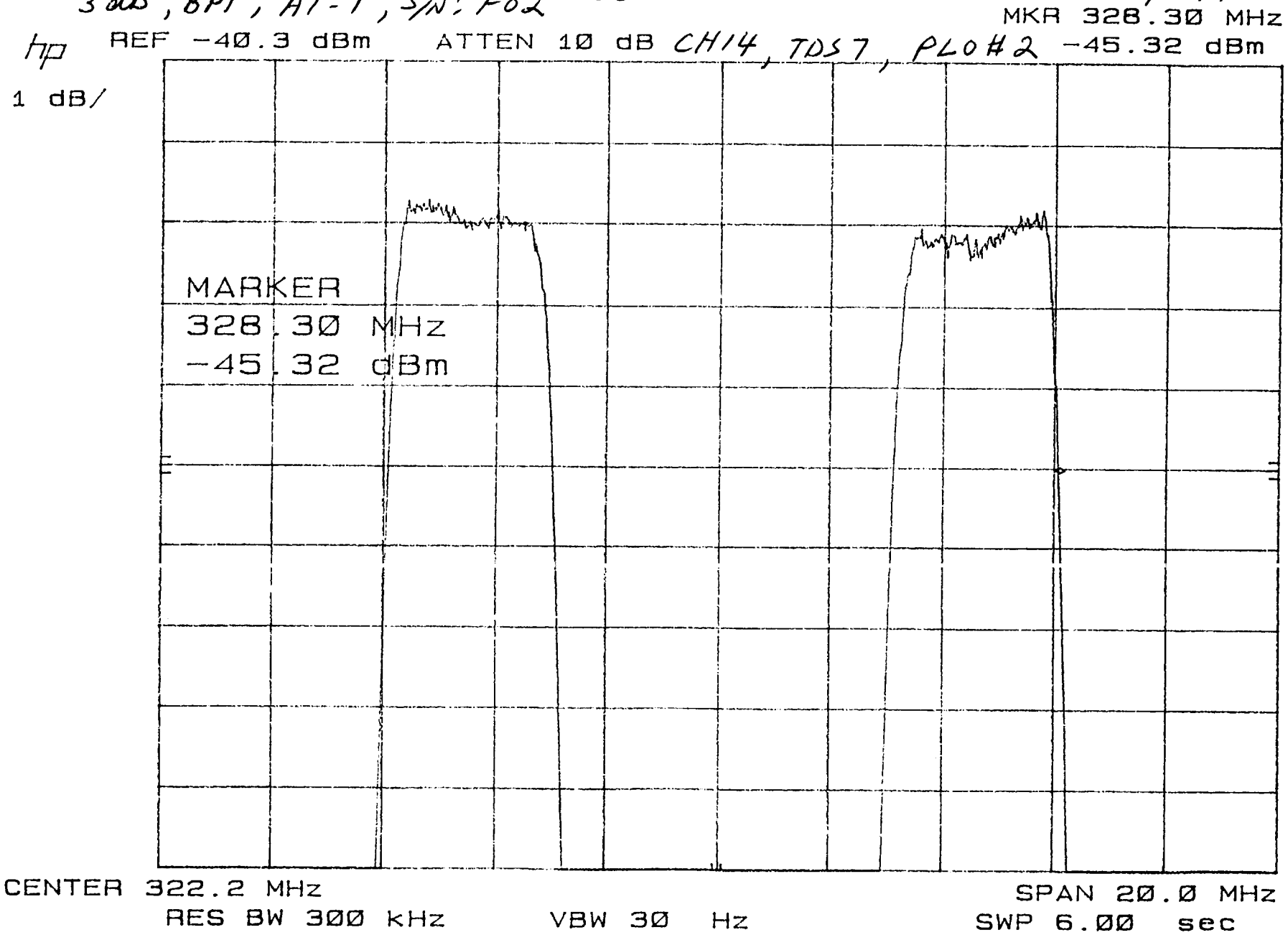
3dB, BPF, A1-1, S/N: F02 FOR REFERENCE ONLY 8/12/98



40 dB BPF, A1-1, S/N: F02 FOR REFERENCE ONLY 8/12/98



3 dB, BPF, A1-1, S/N: F02 **FOR REFERENCE ONLY** 8/12/98



40dB BPF, A1-1, S/N: F02

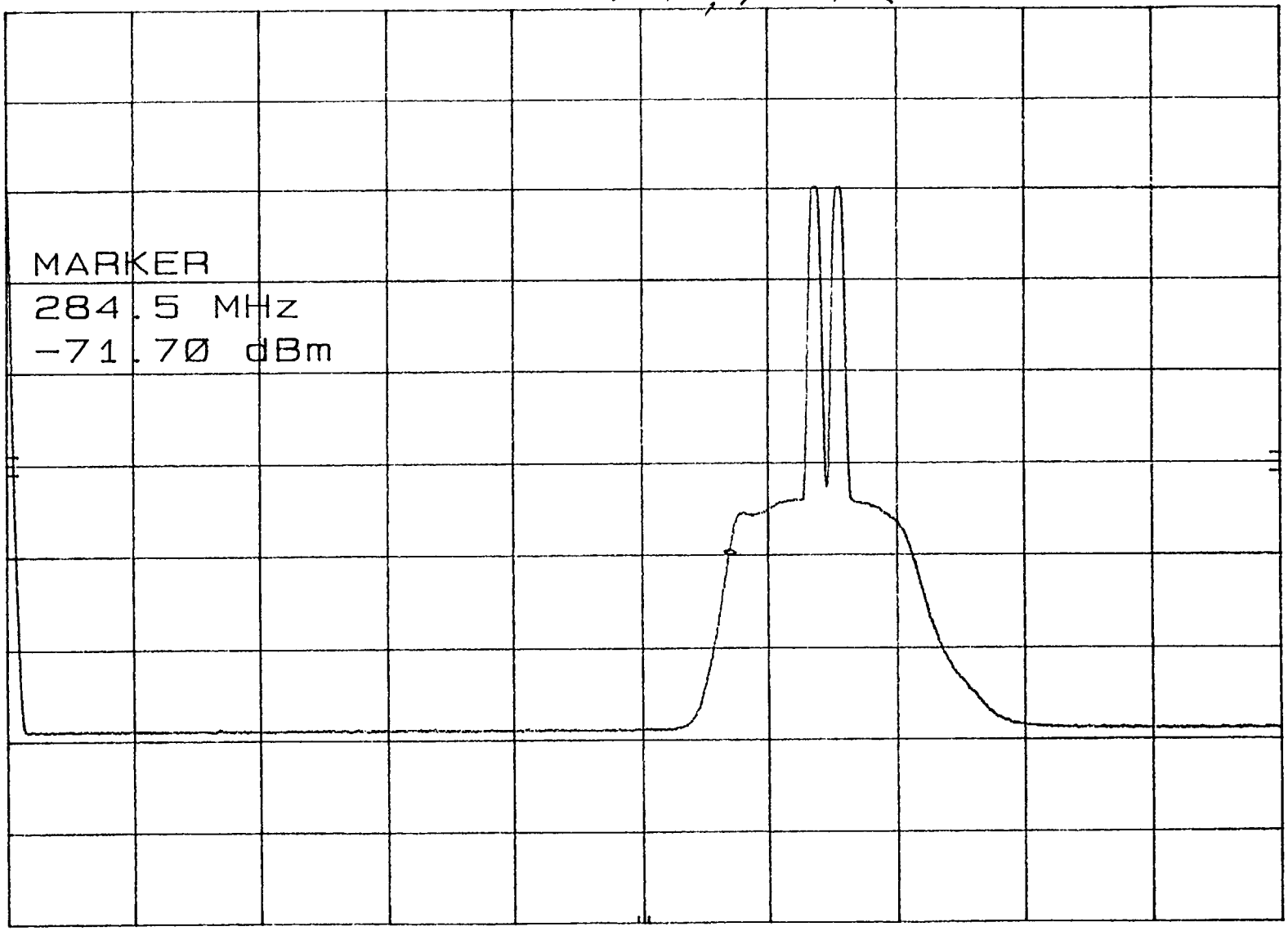
FOR REFERENCE ONLY

8/12/98

hp REF -12.0 dBm ATTEN 0 dB CH14, PLO #2

MKR 284.5 MHz
-71.70 dBm

10 dB/



CENTER 250 MHz

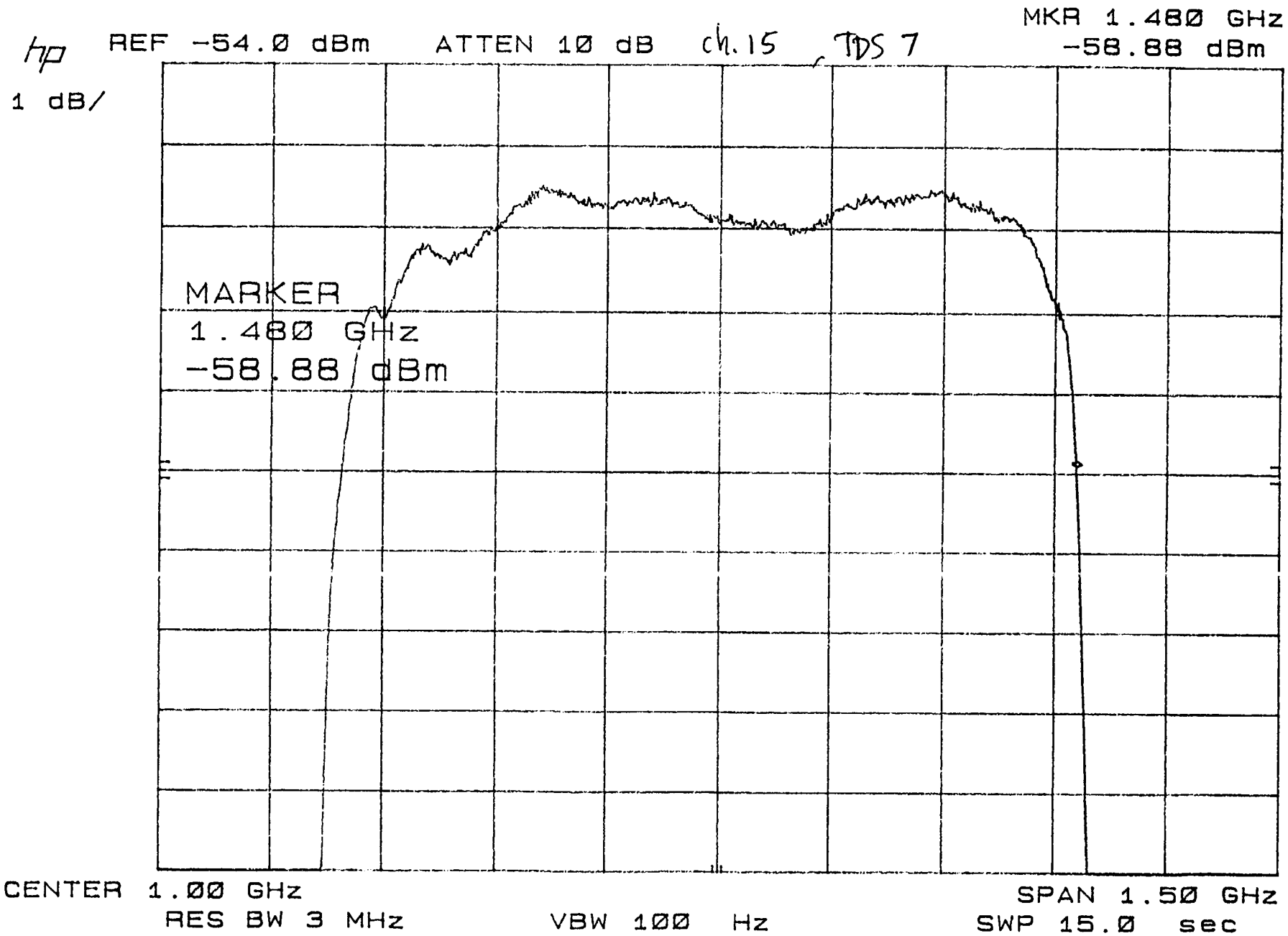
SPAN 500 MHz

RES BW 1 MHz VBW 300 Hz SWP 5.00 sec

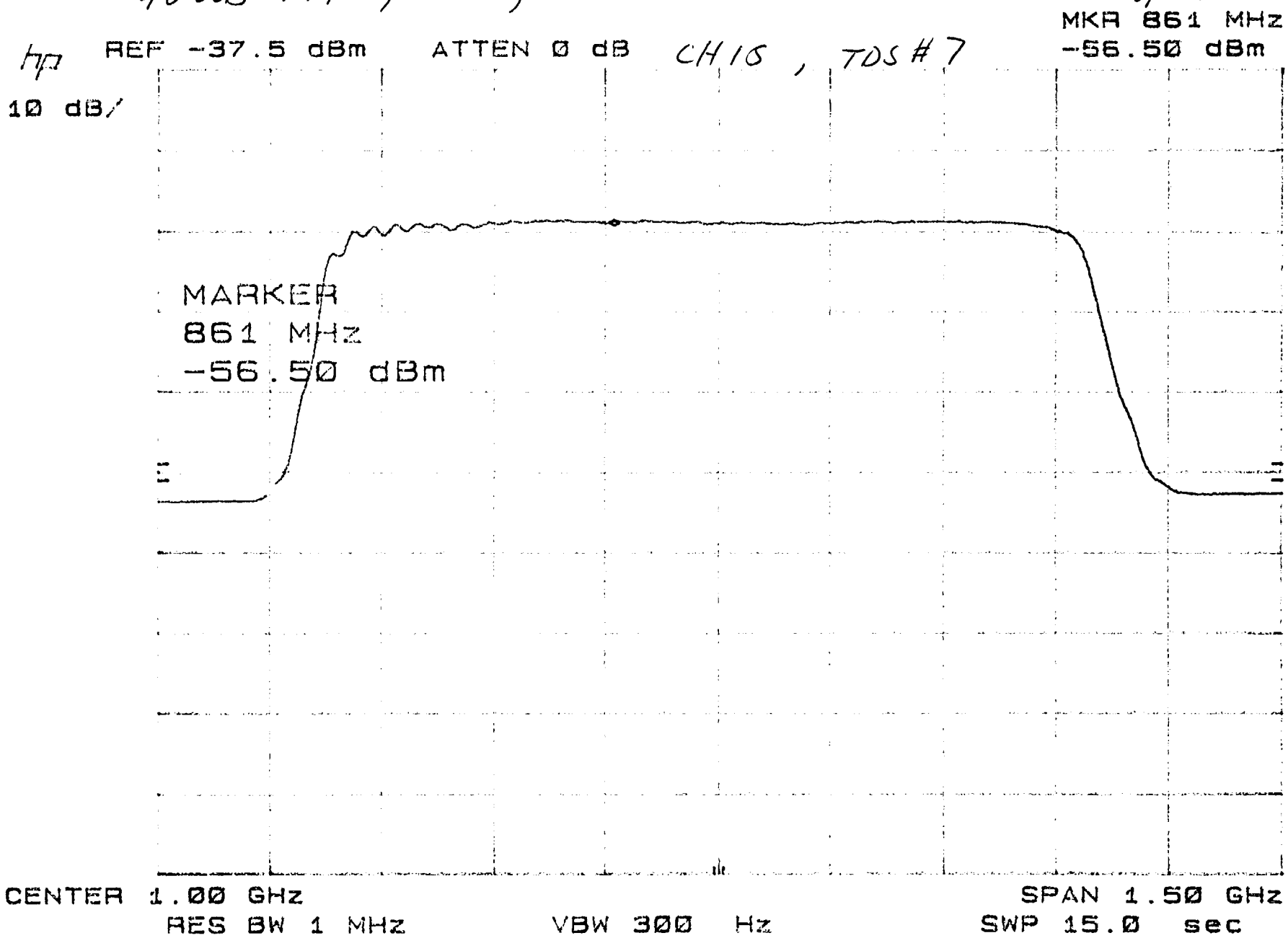
3-dB BPF A1-1 S/N FO2

FOR REFERENCE ONLY

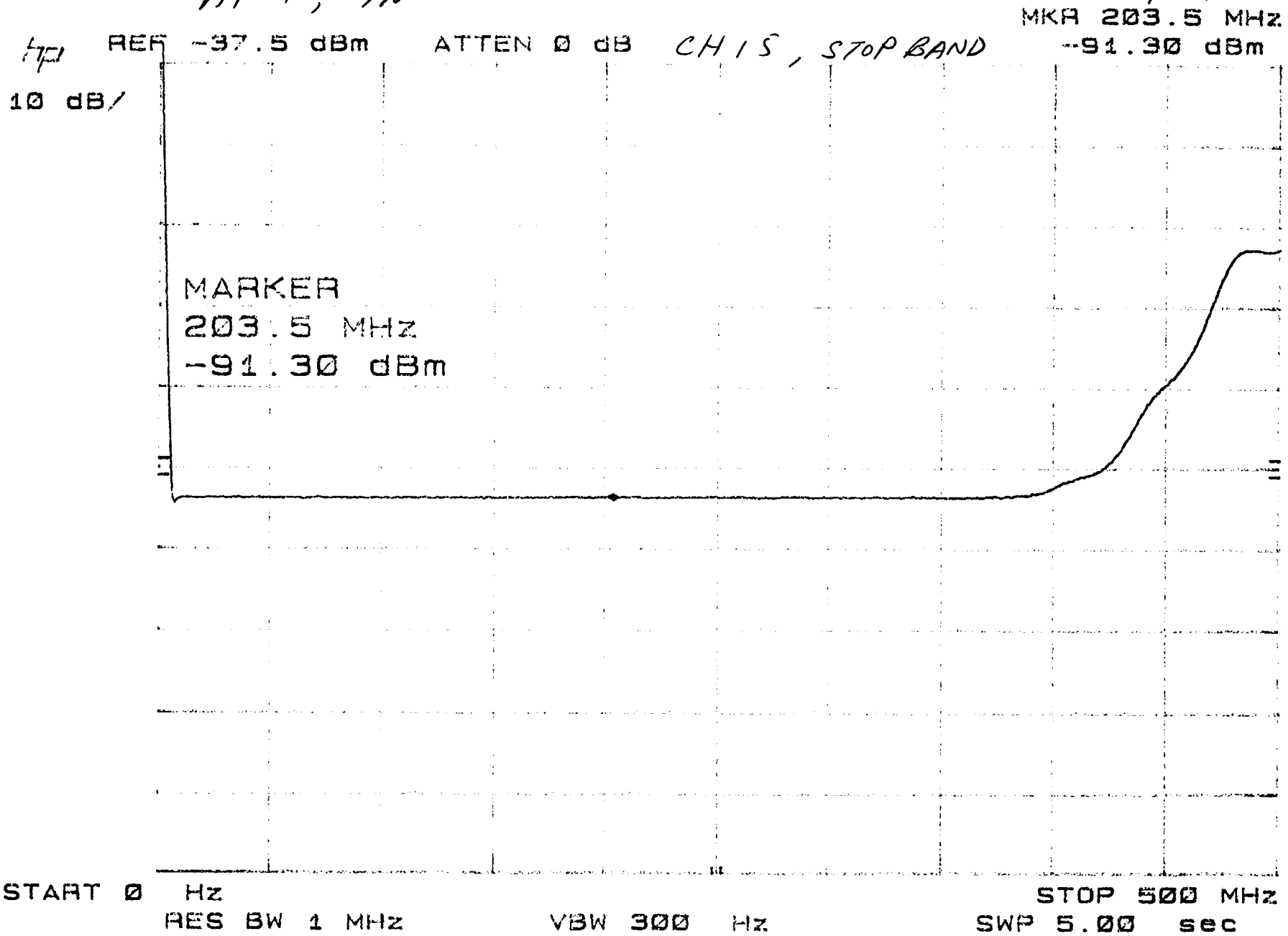
8/12/90



40 dB BPF, A1-1, S/N: F02 FOR REFERENCE ONLY 8/12/98



A1-1, S/N: F02 **FOR REFERENCE ONLY** 8/12/98



Y. Yuh 8/27/98 (QC 229)

TEST DATA SHEET 10 (Sheet 1 of 30)

Noise Figure and Noise Power Stability Test Data (Paragraph 3.5.4) (A1-1)

Test Setup Verified: J. Jones (Signature) Baseplate Temperature (T_B) 30.4 °C

Component	Channel No.	V_b(V)	I_b(mA)	T_H(°C)	V_H (V) Mean	V_H (V) Standard Deviation	T_C(°C)	V_C (V) Mean	V_C (V) Standard Deviation
LO	6	9.98	179.4	22.6	-1.0367	.00019	-194.0	-.7394	.00020
				22.6	-1.0368	.00019	-194.0	-.7377	.00015
				22.6	-1.0372	.00019	-194.0	-.7379	.00012
				22.6	-1.0374	.00019	-194.0	-.7379	.00016
				22.6	-1.0374	.00020	-194.0	-.7384	.00016
				22.6	-1.0374	.00017	-194.0	-.7376	.00019
				22.6	-1.0373	.00020	-194.0	-.7369	.00021
				22.6	-1.0374	.00017	-194.0	-.7368	.00017
				22.6	-1.0376	.00019	-194.0	-.7365	.00014
				22.6	-1.0373	.00020	-194.0	-.7372	.00022
Mixer/ Amps	All	9.90	243.0						
~~IF Amps~~	~~All~~	~~7.90~~	~~266.4~~						

Part No.: 1356429-1

Serial No.: F02

Test Engineer: [signature]

Quality Assurance: [signature] (QA 267) AUG 28 '98

Date: 8/20/98

T. Trinh 3/27/98 (QC 229)

TEST DATA SHEET 10 (Sheet 2 of ~~18~~ 30)

Noise Figure and Noise Power Stability Test Data (Paragraph 3.5.4) (A1-1)

Test Setup Verified: T. Trinh Signature

Baseplate Temperature (T_B) 30.4°C

Component	Channel No.	V_b(V)	I_b(mA)	T_H(°C)	V_H (V) Mean	V_H (V) Standard Deviation	T_C(°C)	V_C (V) Mean	V_C (V) Standard Deviation
LO	7	9.92	194.6	22.4	-.91700	.00017	-194.0	-.66133	.00022
				22.4	-.91698	.00020	-194.0	-.66142	.00014
				22.4	-.91738	.00020	-194.0	-.66486	.00023
				22.4	-.91761	.00017	-194.0	-.66556	.00013
				22.4	-.91770	.00017	-194.0	-.66651	.00018
				22.4	-.91686	.00016	-194.0	-.67320	.00025
				22.4	-.91625	.00018	-194.0	-.67023	.00013
				22.4	-.91647	.00017	-194.0	-.66622	.00024
				22.4	-.91652	.00020	-194.0	-.66722	.00022
				22.4	-.91679	.00018	-194.0	-.66502	.00018
Mixer/ Amps	All	9.93	242.8						
IF Amps	All	7.93	263.2						

Part No.: 1356429-1

Serial No.: F02

Test Engineer: [signature]

Quality Assurance: [signature] (QA 267) AUG 28 '98

Date: 8/13/98

J. Jones 3/27/98 (QC 229)

TEST DATA SHEET 10 (Sheet 16 of 30)

Noise Figure and Noise Power Stability Test Data (Paragraph 3.5.4) (A1-1)

Test Setup Verified: J. Jones (Signature) Baseplate Temperature (T_B) 30.4 °C

Channel No.	NF (dB)				NPS (K)				
	Required (Max)	Measured	Average	Pass/Fail	Required (Max)	Measured	Average	Delta	Pass/Fail
6		4.12				0.03			
		4.10				0.02			
		4.10				0.03			
		4.09				0.05			
		4.10				0.05			
		4.09				0.05			
		4.08				0.06			
		4.08				0.05			
		4.07				0.02			
		4.09				0.05			
	5.15		4.09	P	.08		0.04	0.039	P

Pass = P, Fail = F

Part No.: 1356429-1

Serial No.: F02

Test Engineer: [signature]

Quality Assurance: [signature] (QA 267) AUG 28 '98

Date: 8/20/98

8/13/98 QC 229

TEST DATA SHEET 10 (Sheet 9 of 18)
Noise Figure and Noise Power Stability Test Data (Paragraph 3.5.4) (A1-1)

Test Setup Verified: J. Thorn (Signature) Baseplate Temperature (T_B) 30.2°C

Component	Channel No.	V_b(V)	I_b(mA)	T_H(°C)	V_H (V) Mean	V_H (V) Standard Deviation	T_C(°C)	V_C (V) Mean	V_C (V) Standard Deviation
LO	15	14.87	177.8	22.4	-.90014	.00010	-194.0	-.77781	.00025
				22.4	-.89835	.00007	-194.0	-.77583	.00007
				22.4	-.89641	.00009	-194.0	-.77464	.00016
				22.4	-.89590	.00007	-194.0	-.77507	.00020
				22.4	-.89558	.00009	-194.0	-.77390	.00023
				22.4	-.89506	.00008	-194.0	-.77262	.00020
				22.4	-.89440	.00007	-194.0	-.77223	.00022
				22.4	-.89398	.00008	-194.0	-.76995	.00016
				22.4	-.89365	.00009	-194.0	-.76832	.00011
				22.4	-.89344	.00009	-194.0	-.76758	.00008
Mixer/ Amps	All	9.93	242.8						
IF Amps	All	7.93	263.2						

Part No.: 1356429-1
Serial No.: F02

Test Engineer: [signature]
Quality Assurance:
Date: 8/13/98

FOR REFERENCE ONLY

AMSU-A TEST

AMSU-A1-1, S/N: F02, CH6, NF & NPS TEST DATA, 8/20/98, TB = 30.4°C

SEQ	TEMP_TEST	TEST TEMP	VOLTAGE	STD_DEV	NF (dB)	NPS(K)
1	WARM TEST	295.75	-1.03671799	.00018895	----------	---------
2	COLD TEST	79.15	-.73940706	.00020223	4.12391244	.03492780
3	WARM TEST	295.75	-1.03684932	.00018529	----------	---------
4	COLD TEST	79.15	-.73774798	.00014964	4.09819136	.02196443
5	WARM TEST	295.75	-1.03719792	.00018767	----------	---------
6	COLD TEST	79.15	-.73787553	.00011558	4.09842934	.03058453
7	WARM TEST	295.75	-1.03737562	.00019480	----------	---------
8	COLD TEST	79.15	-.73785682	.00015848	4.09430830	.04851333
9	WARM TEST	295.75	-1.03739221	.00019746	----------	---------
10	COLD TEST	79.15	-.73841217	.00016246	4.10225747	.05394428
11	WARM TEST	295.75	-1.03739878	.00016975	----------	---------
12	COLD TEST	79.15	-.73755289	.00018794	4.08962923	.04916520
13	WARM TEST	295.75	-1.03730652	.00020044	----------	---------
14	COLD TEST	79.15	-.73692176	.00020534	4.08138162	.05917723
15	WARM TEST	295.75	-1.03740627	.00016891	----------	---------
16	COLD TEST	79.15	-.73678778	.00017154	4.07839836	.05052492
17	WARM TEST	295.75	-1.03759073	.00018504	----------	---------
18	COLD TEST	79.15	-.73648460	.00014314	4.07208283	.02007495
19	WARM TEST	295.75	-1.03726119	.00019593	----------	---------
20	COLD TEST	79.15	-.73716551	.00021552	4.08540437	.05077160

CH. 6 ,195 MHz MHz

NOISE FIGURE AVERAGE (dB) = 4.09222177204

NOISE POWER STABILITY (K) = .0419648248006

NOISE POWER STABILITY DELTA (K) = .0391022810684

NPS_MAX (K) = .0591772272759 NPS_MIN (K) = .0200749462075

INTEGRATION TIME = .165

Y. Yuri 8/27/98 QC 229

TEST DATA SHEET 10 (Sheet 2 of 30)

Noise Figure and Noise Power Stability Test Data (Paragraph 3.5.4) (A1-1)

Test Setup Verified: J. Jurney (Signature) Baseplate Temperature (T_B) 30.4°C

Component	Channel No.	V_b(V)	I_b(mA)	T_H(°C)	V_H (V) Mean	V_H (V) Standard Deviation	T_C(°C)	V_C (V) Mean	V_C (V) Standard Deviation
LO	7	9.92	194.6	22.4	-.91700	.00017	-194.0	-.66133	.00022
				22.4	-.91698	.00020	-194.0	-.66142	.00014
				22.4	-.91738	.00020	-194.0	-.66486	.00023
				22.4	-.91761	.00017	-194.0	-.66556	.00013
				22.4	-.91770	.00017	-194.0	-.66651	.00018
				22.4	-.91686	.00016	-194.0	-.67320	.00025
				22.4	-.91625	.00018	-194.0	-.67023	.00013
				22.4	-.91647	.00017	-194.0	-.66622	.00024
				22.4	-.91652	.00020	-194.0	-.66722	.00022
				22.4	-.91679	.00018	-194.0	-.66502	.00018
Mixer/ Amps	All	9.93	242.8						
~~IF Amps~~	~~All~~	~~7.93~~	~~263.2~~						

Part No.: 1356429-1

Serial No.: F02

Test Engineer: [signature]

Quality Assurance: [signature] 7A 267 AUG 28 '98

Date: 8/13/98

Y. Yamaki 8/27/98 QC 223

TEST DATA SHEET 10 (Sheet 11 of 18) 17 30

Noise Figure and Noise Power Stability Test Data (Paragraph 3.5.4) (A1-1)

Test Setup Verified: Y. Yamaki Signature Baseplate Temperature (T_B) 30.4 °C PLO No. 1

Channel No.	NF (dB)				NPS (K)				
	Required (Max)	Measured	Average	Pass/Fail	Required (Max)	Measured	Average	Delta	Pass/Fail
7		4.24				0.02			
		4.25				0.10			
		4.30				0.10			
		4.31				0.03			
		4.33				0.05			
		4.45				0.04			
		4.41				0.08			
		4.34				0.05			
		4.35				0.10			
		4.31				0.06			
	5.15		4.33	P	.08		0.06	0.078	P

Pass = P, Fail = F

Part No.: 1356429-1

Serial No.: F02

Test Engineer: [signature]

Quality Assurance: [signature] QA 267 AUG 28 '98

Date: 8/13/98

AE-26002/6B
10 June 1998

J. Yung 3/27/13 (QC 229)

TEST DATA SHEET 10 (Sheet 5 of 18) 18 30

Noise Figure and Noise Power Stability Test Data (Paragraph 3.5.4) (A1-1)

Test Setup Verified: J. Yung Signature

Baseplate Temperature (T_B) 29.8 °C

PLO NO. 1

PLO #1

Channel No.	NF (dB)				NPS (K)				
	Required (Max)	Measured	Average	Pass/Fail	Required (Max)	Measured	Average	Delta	Pass/Fail
9		3.98				0.01			
		3.96				0.03			
		3.94				0.08			
		3.96				0.04			
		3.96				0.02			
		3.94				0.04			
		3.92				0.05			
		3.90				0.07			
		3.90				0.05			
		3.94				0.02			
	4.7		3.94	P	.08		0.04	0.075	P

Pass = P, Fail = F

Part No.: 1356429-1

Serial No.: F02

Test Engineer: [signature]

Quality Assurance: [signature] (QA 267) AUG 28 '98

Date: 8/15/98

FOR REFERENCE ONLY

AMSU-A TEST

AMSU-A1-1, CH7, S/N: F02, NF & NPS TEST DATA, 8/13/98 $T_B = 30.4\,°C$

SEQ	TEMP_TEST	TEST TEMP	VOLTAGE	STD_DEV	NF (dB)	NPS(K)
1	WARM TEST	295.55	-.91700059	.00016504	----------	----------
2	COLD TEST	79.15	-.66133338	.00021644	4.24437233	.02359698
3	WARM TEST	295.55	-.91698242	.00020026	----------	----------
4	COLD TEST	79.15	-.66141512	.00014238	4.24599534	.09891430
5	WARM TEST	295.55	-.91738170	.00020077	----------	----------
6	COLD TEST	79.15	-.66486118	.00022989	4.30035829	.10076249
7	WARM TEST	295.55	-.91760696	.00016675	----------	----------
8	COLD TEST	79.15	-.66556080	.00012981	4.30965597	.03109206
9	WARM TEST	295.55	-.91769711	.00017385	----------	----------
10	COLD TEST	79.15	-.66650996	.00018276	4.32501726	.05256041
11	WARM TEST	295.55	-.91686133	.00015596	----------	----------
12	COLD TEST	79.15	-.67320459	.00025235	4.45414341	.04097927
13	WARM TEST	295.55	-.91625207	.00018374	----------	----------
14	COLD TEST	79.15	-.67023370	.00013408	4.40905645	.07538009
15	WARM TEST	295.55	-.91647190	.00017421	----------	----------
16	COLD TEST	79.15	-.66622289	.00023904	4.33553942	.05412432
17	WARM TEST	295.55	-.91652130	.00020045	----------	----------
18	COLD TEST	79.15	-.66722072	.00021764	4.35238207	.10178243
19	WARM TEST	295.55	-.91679160	.00017808	----------	----------
20	COLD TEST	79.15	-.66501825	.00017870	4.31050449	.06236177

CH. 7 ,192.6 MHz MHz

NOISE FIGURE AVERAGE (dB) = 4.32914416845

NOISE POWER STABILITY (K) = .0641554134436

NOISE POWER STABILITY DELTA (K) = .078185450062

NPS_MAX (K) = .101782434109 NPS_MIN (K) = .0235969840473

INTEGRATION TIME = .165

AE-26002/6B
10 June 1998

Y. Yuri 3/27/98 (QC 229)

TEST DATA SHEET 10 (Sheet 8 of 18) 18 30

Noise Figure and Noise Power Stability Test Data (Paragraph 3.5.4) (A1-1)

Test Setup Verified: T. Yung (Signature) Baseplate Temperature (T_B) 29.8 °C PLO NO. 1 PLO #1

Channel No.	NF (dB)				NPS (K)				
	Required (Max)	Measured	Average	Pass/Fail	Required (Max)	Measured	Average	Delta	Pass/Fail
9		3.98				0.01			
		3.96				0.03			
		3.94				0.08			
		3.96				0.04			
		3.96				0.02			
		3.94				0.04			
		3.92				0.05			
		3.90				0.07			
		3.90				0.05			
		3.94				0.02			
	4.7		3.94	P	.08		0.04	0.075	P

Pass = P, Fail = F

Part No.: 1356429-1

Serial No.: F02

Test Engineer:

Quality Assurance: (QA 267) AUG 28 '98

Date: 8/15/98

Y. Yuriko QC 229 8/27/98

TEST DATA SHEET 10 (Sheet 3 of 18) 30

Noise Figure and Noise Power Stability Test Data (Paragraph 3.5.4) (A1-1)

Test Setup Verified: 7. Yuriko Signature Baseplate Temperature (T_B) 29.8 °C PLO No. 1

PLO #1

Component	Channel No.	V_b(V)	I_b(mA)	T_H(°C)	V_H (V) Mean	V_H (V) Standard Deviation	T_C(°C)	V_C (V) Mean	V_C (V) Standard Deviation
LO	9	Positive 15.07	523.0	22.6	-.8417	.00017	-194.0	-.5923	.00015
				22.6	-.8411	.00016	-194.0	-.5905	.00016
				22.6	-.8407	.00019	-194.0	-.5893	.00015
				22.6	-.8402	.00016	-194.0	-.5903	.00014
				22.6	-.8397	.00017	-194.0	-.5899	.00017
		Negative -15.1	-57.8	22.6	-.8395	.00016	-194.0	-.5883	.00021
				22.6	-.8388	.00015	-194.0	-.5865	.00013
				22.6	-.8384	.00019	-194.0	-.5855	.00013
				22.6	-.8380	.00016	-194.0	-.5852	.00018
				22.6	-.8375	.00017	-194.0	-.5868	.00019
Mixer/ Amps	All	9.93	242.8						
IF Amps	All	7.93	263.2						

Part No.: 1356429-1

Serial No.: F02

Test Engineer:

Quality Assurance: QA 267 AUG 28 '98

Date: 8/15/98

T. Grunl, 8/27/98 (QC 229)

TEST DATA SHEET 10 (Sheet 4 of 18) 30

Noise Figure and Noise Power Stability Test Data (Paragraph 3.5.4) (A1-1)

Test Setup Verified: J. Grunl Signature Baseplate Temperature T_B) 30.1 °C PLOT NO. 1 PLOT #1

Component	Channel No.	V_b(V)	I_b(mA)	T_H(°C)	V_H (V) Mean	V_H (V) Standard Deviation	T_C(°C)	V_C (V) Mean	V_C (V) Standard Deviation
LO	10	Positive 15.07	523.0	22.6	-.9835	.00026	-194.0	-.7214	.00037
				22.6	-.9835	.00029	-194.0	-.7210	.00037
				22.6	-.9838	.00033	-194.0	-.7192	.00035
				22.6	-.9840	.00025	-194.0	-.7178	.00057
				22.6	-.9840	.00025	-194.0	-.7155	.00026
		Negative -15.1	-57.8	22.6	-.9844	.00030	-194.0	-.7167	.00036
				22.6	-.9844	.00027	-194.0	-.7153	.00033
				22.6	-.9847	.00025	-194.0	-.7158	.00023
				22.6	-.9847	.00029	-194.0	-.7165	.00041
				22.6	-.9850	.00032	-194.0	-.7160	.00036
Mixer/ Amps	All	9.93	242.8						
IF Amps	All	7.93	263.2						

Part No.: 1356429-1

Serial No.: F02

Test Engineer:

Quality Assurance: (ZA 267) AUG 28 '98

Date: 8/15/98

FOR REFERENCE ONLY

AMSU-A TEST

AMSU-A1-1, S/N: F02, CH9, PLO #1, NF & NPS TEST DATA, 8/15/98 $T_B = 29.8\,^{\circ}C$

SEQ	TEMP_TEST	TEST TEMP	VOLTAGE	STD_DEV	NF (dB)	NPS(K)
1	WARM TEST	295.75	-.84168690	.00016622	----------	----------
2	COLD TEST	79.15	-.59232979	.00014524	3.98160180	.00900800
3	WARM TEST	295.75	-.84110554	.00016251	----------	----------
4	COLD TEST	79.15	-.59048570	.00016144	3.95646586	.02835118
5	WARM TEST	295.75	-.84067106	.00019233	----------	----------
6	COLD TEST	79.15	-.58927961	.00014925	3.94074680	.08412607
7	WARM TEST	295.75	-.84019400	.00016019	----------	----------
8	COLD TEST	79.15	-.59031390	.00014047	3.96465918	.03640265
9	WARM TEST	295.75	-.83973152	.00016725	----------	----------
10	COLD TEST	79.15	-.58995596	.00017415	3.96408069	.02085802
11	WARM TEST	295.75	-.83945783	.00015965	----------	----------
12	COLD TEST	79.15	-.58834927	.00020710	3.93935350	.03748057
13	WARM TEST	295.75	-.83884242	.00015474	----------	----------
14	COLD TEST	79.15	-.58653387	.00013328	3.91527216	.04999435
15	WARM TEST	295.75	-.83843503	.00018516	----------	----------
16	COLD TEST	79.15	-.58549553	.00013298	3.90221121	.07150378
17	WARM TEST	295.75	-.83797238	.00015606	----------	----------
18	COLD TEST	79.15	-.58520800	.00017751	3.90282692	.04635339
19	WARM TEST	295.75	-.83753480	.00016740	----------	----------
20	COLD TEST	79.15	-.58676333	.00018824	3.93519403	.02400361

CH. 9 ,156 MHz MHz

NOISE FIGURE AVERAGE (dB) = 3.94031758218

NOISE POWER STABILITY (K) = .0408081614393

NOISE POWER STABILITY DELTA (K) = .0751180730566

NPS_MAX (K) = .0841260708855 NPS_MIN (K) = .00900799782886

INTEGRATION TIME = .165

J. Trinh 8/27/98 (QC 229)

TEST DATA SHEET 10 (Sheet 4 of 30)

Noise Figure and Noise Power Stability Test Data (Paragraph 3.5.4) (A1-1)

Test Setup Verified: 2.2 m
Signature

Baseplate Temperature (T_B) 30.1 °C

PLO No. 1
PLO # 1

Component	Channel No.	V_b(V)	I_b(mA)	T_H(°C)	V_H (V) Mean	V_H (V) Standard Deviation	T_C(°C)	V_C (V) Mean	V_C (V) Standard Deviation
LO	10	Positive 15.07	523.0	22.6	-.9835	.00026	-194.0	-.7214	.00037
				22.6	-.9835	.00029	-194.0	-.7210	.00037
				22.6	-.9838	.00033	-194.0	-.7192	.00035
				22.6	-.9840	.00025	-194.0	-.7178	.00057
				22.6	-.9840	.00025	-194.0	-.7155	.00026
		Negative -15.1	-59.8	22.6	-.9849	.00030	-194.0	-.7167	.00036
				22.6	-.9849	.00027	-194.0	-.7153	.00033
				22.6	-.9847	.00025	-194.0	-.7158	.00023
				22.6	-.9847	.00029	-194.0	-.7165	.00041
				22.6	-.9850	.00032	-194.0	-.7160	.00036
Mixer/ Amps	All	9.93	242.8	[redacted]					
IF Amps	All	7.93	263.2						

Part No.: 1356429-1

Serial No.: F02

Test Engineer:

Quality Assurance: (ZA 267) AUG 28 '98

Date: 8/15/98

Y. Yuri QC 229 8/27/98

TEST DATA SHEET 10 (Sheet 19 of 30)

Noise Figure and Noise Power Stability Test Data (Paragraph 3.5.4) (A1-1)

Test Setup Verified: T. Yung Signature

Baseplate Temperature (T_B) 30.1 °C

PLO No. 1
PLO #1

Channel No.	NF (dB)				NPS (K)				
	Required (Max)	Measured	Average	Pass/Fail	Required (Max)	Measured	Average	Delta	Pass/Fail
10		4.44				0.08			
		4.44				0.08			
		4.40				0.15			
		4.38				0.09			
		4.34				0.10			
		4.36				0.09			
		4.33				0.05			
		4.34				0.09			
		4.35				0.06			
		4.34				0.13			
	4.7		4.37	P	0.12		0.09	0.099	P

Pass = P, Fail = F

Part No.: 1356429-1

Serial No.: F02

Test Engineer: T. Yung

Quality Assurance: J. M. Chavez TA 267 AUG 28 '98

Date: 8/25/98

AE-26002/6B
10 June 1998

Y. Yuen 8/27/98 (QC 229)

TEST DATA SHEET 10 (Sheet 1 of 18) 20, 30

Noise Figure and Noise Power Stability Test Data (Paragraph 3.5.4) (A1-1)

Test Setup Verified: _____ Signature

Baseplate Temperature (T_B) 30.4 °C

PLO #1

Channel No.	NF (dB) Required (Max)	NF (dB) Measured	NF (dB) Average	NF (dB) Pass/Fail	NPS (K) Required (Max)	NPS (K) Measured	NPS (K) Average	NPS (K) Delta	NPS (K) Pass/Fail
11		4.39				0.11			
		4.39				0.06			
		4.39				0.08			
		4.38				0.04			
		4.38				0.09			
		4.41				0.03			
		4.41				0.08			
		4.39				0.08			
		4.39				0.10			
		4.39				0.10			
	4.7		4.39	P	.12		0.08	0.086	P

Pass = P, Fail = F

Part No.: 1356429-1

Serial No.: F02

Test Engineer: _____

Quality Assurance: _____ (QA 267) AUG 28 '98

Date: 8/28/98

AMSU-A TEST

FOR REFERENCE ONLY

AMSU-A1-1, S/N: F02, CH 10, PLO #1, NF & NPS TEST DATA, 8/15/98, Tb = 30.1°C

SEQ	TEMP_TEST	TEST TEMP	VOLTAGE	STD_DEV	NF (dB)	NPS(K)
1	WARM TEST	295.75	-.98352035	.00025970	----------	---------
2	COLD TEST	79.15	-.72137507	.00036563	4.44417902	.07703029
3	WARM TEST	295.75	-.98350285	.00029133	----------	---------
4	COLD TEST	79.15	-.72097141	.00036862	4.43766295	.07713483
5	WARM TEST	295.75	-.98380010	.00032966	----------	---------
6	COLD TEST	79.15	-.71920760	.00034595	4.40477927	.14756827
7	WARM TEST	295.75	-.98397695	.00025111	----------	---------
8	COLD TEST	79.15	-.71782849	.00057253	4.37991772	.09332425
9	WARM TEST	295.75	-.98403551	.00024865	----------	---------
10	COLD TEST	79.15	-.71550416	.00026195	4.34118628	.09675435
11	WARM TEST	295.75	-.98443291	.00029726	----------	---------
12	COLD TEST	79.15	-.71665549	.00035816	4.35525208	.08892695
13	WARM TEST	295.75	-.98443102	.00026943	----------	---------
14	COLD TEST	79.15	-.71533447	.00032952	4.33374625	.04887183
15	WARM TEST	295.75	-.98470122	.00025269	----------	---------
16	COLD TEST	79.15	-.71576260	.00023365	4.33751509	.08992843
17	WARM TEST	295.75	-.98468410	.00028674	----------	---------
18	COLD TEST	79.15	-.71650293	.00040858	4.34977719	.06206632
19	WARM TEST	295.75	-.98504634	.00031894	----------	---------
20	COLD TEST	79.15	-.71601536	.00035927	4.33754597	.12819267

CH. 10 ,77 MHz MHz

NOISE FIGURE AVERAGE (dB) = 4.37234338829

NOISE POWER STABILITY (K) = .0909798197947

NOISE POWER STABILITY DELTA (K) = .0986964437638

NPS_MAX (K) = .147568274552 NPS_MIN (K) = .0488718307884

INTEGRATION TIME = .165

Y. Yuki 8/27/98 QC 229

TEST DATA SHEET 10 (Sheet 5 of 30)

Noise Figure and Noise Power Stability Test Data (Paragraph 3.5.4) (A1-1)

Test Setup Verified: J. Yuki
Signature

Baseplate Temperature (T_B) 30.4 °C

PLO No. 1

PLO #1

Component	Channel No.	V_b(V)	I_b(mA)	T_H(°C)	V_H (V) Mean	V_H (V) Standard Deviation	T_C(°C)	V_C (V) Mean	V_C (V) Standard Deviation
LO	11	Positive 15.07	523.0	22.6	-.9960	.00626	-194.0	-.7275	.00044
				22.6	-.9980	.00030	-194.0	-.7284	.00057
				22.6	-.9971	.00031	-194.0	-.7282	.00057
				22.6	-.9964	.00030	-194.0	-.7270	.00054
				22.6	-.9960	.00031	-194.0	-.7266	.00040
		Negative -15.1	-57.3	22.6	-.9961	.00029	-194.0	-.7283	.00046
				22.6	-.9962	.00028	-194.0	-.7284	.00036
				22.6	-.9963	.00028	-194.0	-.7275	.00042
				22.6	-.9963	.00027	-194.0	-.7276	.00038
				22.6	-.9960	.00032	-194.0	-.7271	.00045
Mixer/ Amps	All	9.93	242.8						
IF Amps	All	7.93	263.2						

Part No.: 1356429 - 1

Serial No.: F02

Test Engineer:

Quality Assurance: 7A 267 AUG 28 '98

Date: 8/18/98

J. Grimbi 8/27/98 (QC 229)

TEST DATA SHEET 10 (Sheet 6 of 18) 30

Noise Figure and Noise Power Stability Test Data (Paragraph 3.5.4) (A1-1)

Test Setup Verified: J. [illegible] Signature Baseplate Temperature (T_B) 30.4 °C PLO NO. 1

PLO #1

Component	Channel No.	V_b(V)	I_b(mA)	T_H(°C)	V_H (V) Mean	V_H (V) Standard Deviation	T_C(°C)	V_C (V) Mean	V_C (V) Standard Deviation
LO	12	Positive 15.07	523.0	22.6	-.9337	.00040	-194.0	-.6819	.00066
				22.6	-.9327	.00036	-194.0	-.6812	.00048
				22.6	-.9327	.00038	-194.0	-.6815	.00059
				22.6	-.9322	.00041	-194.0	-.6817	.00048
				22.6	-.9323	.00040	-194.0	-.6804	.00052
		Negative -15.1	-57.8	22.6	-.9322	.00038	-194.0	-.6806	.00062
				22.6	-.9323	.00043	-194.0	-.6813	.00050
				22.6	-.9323	.00046	-194.0	-.6801	.00047
				22.6	-.9322	.00037	-194.0	-.6804	.00060
				22.6	-.9318	.00039	-194.0	-.6808	.00052
Mixer/ Amps	All	9.93	242.8						
IF Amps	All	7.93	263.2						

Part No.: 1356429-1

Serial No.: F02

Test Engineer: [signature]

Quality Assurance: [signature] (QA E67) AUG 28 98

Date: 8/28/98

AE-26002/6B
10 June 1998

Y. Yuh 8/27/98 (QC 229)

TEST DATA SHEET 10 (Sheet 14 of 18) 20, 30

Noise Figure and Noise Power Stability Test Data (Paragraph 3.5.4) (A1-1)

Test Setup Verified: J.J. Signature

Baseplate Temperature (T_B) 30.4 °C

PLO # 1

Channel No.	NF (dB)				NPS (K)				
	Required (Max)	Measured	Average	Pass/Fail	Required (Max)	Measured	Average	Delta	Pass/Fail
11		4.39				0.11			
		4.39				0.06			
		4.39				0.08			
		4.38				0.04			
		4.38				0.09			
		4.41				0.03			
		4.41				0.08			
		4.39				0.08			
		4.39				0.10			
		4.39				0.10			
	4.7		4.39	P	.12		0.08	0.086	P

Pass = P, Fail = F

Part No.: 1356429-1

Serial No.: F02

Test Engineer:

Quality Assurance: (TA 267) AUG 28 '98

Date: 8/28/98

FOR REFERENCE ONLY

AMSU-A TEST

AMSU-A1-1, S/N: F02, CH11, PLO #1, NF & NPS TEST DATA, 8/18/98, TB = 30.4 C

SEQ	TEMP_TEST	TEST TEMP	VOLTAGE	STD_DEV	NF (dB)	NPS(K)
1	WARM TEST	295.75	-.99598303	.00025688	----------	---------
2	COLD TEST	79.15	-.72750336	.00043778	4.39482020	.11415792
3	WARM TEST	295.75	-.99801154	.00030415	----------	---------
4	COLD TEST	79.15	-.72841075	.00057052	4.38549209	.06298622
5	WARM TEST	295.75	-.99711521	.00030956	----------	---------
6	COLD TEST	79.15	-.72818174	.00056838	4.39240238	.07900910
7	WARM TEST	295.75	-.99639974	.00029812	----------	---------
8	COLD TEST	79.15	-.72699796	.00054289	4.38165190	.04252277
9	WARM TEST	295.75	-.99593344	.00031318	----------	---------
10	COLD TEST	79.15	-.72664921	.00040159	4.38151337	.08841450
11	WARM TEST	295.75	-.99610551	.00029120	----------	---------
12	COLD TEST	79.15	-.72828827	.00045855	4.40616409	.02842055
13	WARM TEST	295.75	-.99616509	.00027745	----------	---------
14	COLD TEST	79.15	-.72841165	.00035986	4.40746783	.07700528
15	WARM TEST	295.75	-.99626644	.00027609	----------	---------
16	COLD TEST	79.15	-.72750648	.00041879	4.39150031	.07990830
17	WARM TEST	295.75	-.99630635	.00026847	----------	---------
18	COLD TEST	79.15	-.72756172	.00037785	4.39192520	.09533125
19	WARM TEST	295.75	-.99598571	.00031773	----------	---------
20	COLD TEST	79.15	-.72706643	.00044907	4.38767526	.09846650

CH. 11 ,69.9 MHz MHz

NOISE FIGURE AVERAGE (dB) = 4.39206962782

NOISE POWER STABILITY (K) = .07662223882

NOISE POWER STABILITY DELTA (K) = .0857373727672

NPS_MAX (K) = .114157919092 NPS_MIN (K) = .028420546325

INTEGRATION TIME = .165

Y. Yamada 8/27/98 (QC 229)

30

TEST DATA SHEET 10 (Sheet 6 of 18)

Noise Figure and Noise Power Stability Test Data (Paragraph 3.5.4) (A1-1)

Test Setup Verified: [signature] Signature

Baseplate Temperature (T_B) 30.4°C PLO No. 1

PLO #1

Component	Channel No.	V_b(V)	I_b(mA)	T_H(°C)	V_H (V) Mean	V_H (V) Standard Deviation	T_C(°C)	V_C (V) Mean	V_C (V) Standard Deviation
LO	12	Positive 15.07	523.0	22.6	-.9337	.00040	-194.0	-.6819	.00066
				22.6	-.9327	.00036	-194.0	-.6812	.00048
				22.6	-.9327	.00038	-194.0	-.6815	.00059
				22.6	-.9322	.00041	-194.0	-.6817	.00048
				22.6	-.9323	.00040	-194.0	-.6804	.00052
		Negative -15.1	-57.8	22.6	-.9322	.00038	-194.0	-.6806	.00062
				22.6	-.9325	.00043	-194.0	-.6813	.00050
				22.6	-.9323	.00046	-194.0	-.6801	.00047
				22.6	-.9322	.00037	-194.0	-.6804	.00060
				22.6	-.9318	.00039	-194.0	-.6808	.00052
Mixer/ Amps	All	9.93	242.8						
IF Amps	All	7.93	263.2						

Part No.: 1356429-1

Serial No.: F02

Test Engineer: [signature]

Quality Assurance: [signature] (QA 267) AUG 28 '98

Date: 8/28/98

T. Smith 8/27/98 QC 229

TEST DATA SHEET 10 (Sheet 21 of 30)

Noise Figure and Noise Power Stability Test Data (Paragraph 3.5.4) (A1-1)

Test Setup Verified: T. Smith Signature

Baseplate Temperature (T_B) 30.4 °C

PLO NO. 1

PLO #1

Channel No.	NF (dB)				NPS (K)				
	Required (Max)	Measured	Average	Pass/Fail	Required (Max)	Measured	Average	Delta	Pass/Fail
12		4.39				0.09			
		4.39				0.17			
		4.40				0.14			
		4.41				0.04			
		4.38				0.09			
		4.39				0.14			
		4.40				0.09			
		4.38				0.17			
		4.39				0.15			
		4.40				0.11			
	4.7		4.39	P	0.18		0.12	0.131	P

Pass = P, Fail = F

Part No.: 1356429-1

Serial No.: F02

Test Engineer: [signature]

Quality Assurance: [signature] QA 267 AUG 28 '98

Date: 8/18/98

Y. Yuh 3/27/98 (QC 229)

TEST DATA SHEET 10 (Sheet 22 of 30)

Noise Figure and Noise Power Stability Test Data (Paragraph 3.5.4) (A1-1)

Test Setup Verified: J.J. Signature

Baseplate Temperature (T_B) 30.2 °C

PLO No. 1

PLO #1

Channel No.	NF (dB) Required (Max)	NF (dB) Measured	NF (dB) Average	NF (dB) Pass/Fail	NPS (K) Required (Max)	NPS (K) Measured	NPS (K) Average	NPS (K) Delta	NPS (K) Pass/Fail
13		4.40				0.21			
		4.42				0.17			
		4.44				0.13			
		4.40				0.12			
		4.45				0.26			
		4.42				0.13			
		4.43				0.33			
		4.51				0.27			
		4.41				0.09			
		4.45				0.14			
	4.7		4.43	P	0.24		0.18	0.244	P

Pass = P, Fail = F

Part No.: 356429-1

Serial No.: F02

Test Engineer:

Quality Assurance: (QA 267) AUG 28 '98

Date: 8/18/98

FOR REFERENCE ONLY

AMSU-A TEST

AMSU-A1-1, S/N: F02, CH12, PLO #1, NF & NPS TEST DATA, 8/18/98, TB = 30.4 C

SEQ	TEMP_TEST	TEST TEMP	VOLTAGE	STD_DEV	NF (dB)	NPS(K)
1	WARM TEST	295.75	-.93370962	.00039778	----------	----------
2	COLD TEST	79.15	-.68193055	.00065691	4.39332622	.09290829
3	WARM TEST	295.75	-.93273462	.00036180	----------	----------
4	COLD TEST	79.15	-.68121841	.00047655	4.39332527	.16928237
5	WARM TEST	295.75	-.93265428	.00037644	----------	----------
6	COLD TEST	79.15	-.68154374	.00058597	4.40000930	.14382762
7	WARM TEST	295.75	-.93220171	.00041458	----------	----------
8	COLD TEST	79.15	-.68171846	.00047540	4.40882692	.04349878
9	WARM TEST	295.75	-.93234597	.00039672	----------	----------
10	COLD TEST	79.15	-.68042901	.00051660	4.38453797	.09424085
11	WARM TEST	295.75	-.93222952	.00037817	----------	----------
12	COLD TEST	79.15	-.68063303	.00061921	4.38955990	.13973468
13	WARM TEST	295.75	-.93229153	.00042560	----------	----------
14	COLD TEST	79.15	-.68131532	.00049747	4.40064819	.09358151
15	WARM TEST	295.75	-.93228459	.00045886	----------	----------
16	COLD TEST	79.15	-.68006868	.00047424	4.37906217	.17426578
17	WARM TEST	295.75	-.93222378	.00037005	----------	----------
18	COLD TEST	79.15	-.68036870	.00059756	4.38503930	.15484201
19	WARM TEST	295.75	-.93181750	.00039026	----------	----------
20	COLD TEST	79.15	-.68080787	.00051892	4.39784112	.11219189

CH. 12 ,31.1 MHz MHz

NOISE FIGURE AVERAGE (dB) = 4.3932259528

NOISE POWER STABILITY (K) = .121837378498

NOISE POWER STABILITY DELTA (K) = .130766993197

NPS_MAX (K) = .174265777187 NPS_MIN (K) = .0434987839904

INTEGRATION TIME = .165

8/27/98 QC 229

TEST DATA SHEET 10 (Sheet 7 of ~~18~~ 30)

Noise Figure and Noise Power Stability Test Data (Paragraph 3.5.4) (A1-1)

Test Setup Verified: _____ Signature Baseplate Temperature (T_B) 30.2 °C PLO No. 1

PLO #1

Component	Channel No.	V_b(V)	I_b(mA)	T_H(°C)	V_H (V) Mean	V_H (V) Standard Deviation	T_C(°C)	V_C (V) Mean	V_C (V) Standard Deviation
LO	13	Positive 15.07	523.0	22.6	-1.0789	.00072	-194.0	-.7885	.00053
				22.6	-1.0768	.00062	-194.0	-.7885	.00058
				22.6	-1.0760	.00068	-194.0	-.7890	.00063
				22.6	-1.0758	.00068	-194.0	-.7861	.00056
				22.6	-1.0752	.00057	-194.0	-.7892	.00062
		Negative -15.1	-57.8	22.6	-1.0756	.00069	-194.0	-.7876	.00057
				22.6	-1.0756	.00080	-194.0	-.7877	.00059
				22.6	-1.0756	.00075	-194.0	-.7930	.00057
				22.6	-1.0757	.00067	-194.0	-.7868	.00050
				22.6	-1.0755	.00069	-194.0	-.7891	.00059
Mixer/ Amps	All	9.93	242.8						
IF Amps	All	7.93	263.2						

Part No.: 1356429-1

Serial No.: F02

Test Engineer: _____

Quality Assurance: _____ QA 267 AUG 28 '98

Date: 8/18/98

Y. Yung 3/27/98 QC 229

TEST DATA SHEET 10 (Sheet 8 of 18) 30

Noise Figure and Noise Power Stability Test Data (Paragraph 3.5.4) (A1-1)

Test Setup Verified: J. Zung (Signature) Baseplate Temperature (T_B) 30.2°C PLO No. 1 PLO #1

Component	Channel No.	V_b(V)	I_b(mA)	T_H(°C)	V_H (V) Mean	V_H (V) Standard Deviation	T_C(°C)	V_C (V) Mean	V_C (V) Standard Deviation
LO	14	Positive 15.07	523.0	22.6	-.8956	.00092	-194.0	-.6562	.00079
				22.6	-.8955	.00088	-194.0	-.6557	.00075
				22.6	-.8963	.00094	-194.0	-.6613	.00077
				22.6	-.8959	.00091	-194.0	-.6605	.00099
				22.6	-.8959	.00087	-194.0	-.6595	.00079
		Negative -15.1	-57.8	22.6	-.8957	.00085	-194.0	-.6587	.00069
				22.6	-.8958	.00088	-194.0	-.6581	.00071
				22.6	-.8956	.00084	-194.0	-.6583	.00078
				22.6	-.8954	.00091	-194.0	-.6586	.00064
				22.6	-.8957	.00089	-194.0	-.6580	.00071
Mixer/ Amps	All	9.93	242.8						
IF Amps	All	7.93	263.2						

Part No.: 1356429-1

Serial No.: F02

Test Engineer:

Quality Assurance: QA 267 AUG 28 '98

Date: 8/18/98

AE-26002/6B
10 June 1998
Y. Grich 3/27/98 (QC 229)

TEST DATA SHEET 10 (Sheet 16 of 18) (22 of 30)
Noise Figure and Noise Power Stability Tes Data (Paragraph 3.5.4) (A1-1)

Test Setup Verified: _____ Signature Baseplate Temperature (T_B) 30.2 °C PLO No. 1

PLO #1

Channel No.	NF (dB)				NPS (K)				
	Required (Max)	Measured	Average	Pass/Fail	Required (Max)	Measured	Average	Delta	Pass/Fail
13		4.40				0.21			
		4.42				0.17			
		4.44				0.13			
		4.40				0.12			
		4.45				0.26			
		4.42				0.13			
		4.43				0.33			
		4.51				0.27			
		4.41				0.09			
		4.45				0.14			
	4.7		4.43	P	0.24		0.18	0.244	P

Pass = P, Fail = F

Part No.: 1356429-1

Serial No.: F0.2

Test Engineer: _____

Quality Assurance: _____ (QA 267) AUG 28 '98

Date: 8/18/98

FOR REFERENCE ONLY

AMSU-A TEST

AMSU-A1-1, S/N: F02, CH13, PLO #1, NF & NPS TEST DATA, 8/18/98, TB = 30.2 C

SEQ	TEMP_TEST	TEST TEMP	VOLTAGE	STD_DEV	NF (dB)	NPS(K)
1	WARM TEST	295.75	-1.07889405	.00072394	----------	----------
2	COLD TEST	79.15	-.78847511	.00053224	4.40099759	.21147475
3	WARM TEST	295.75	-1.07676010	.00062382	----------	----------
4	COLD TEST	79.15	-.78847052	.00058156	4.42452675	.17262240
5	WARM TEST	295.75	-1.07595438	.00068467	----------	----------
6	COLD TEST	79.15	-.78897807	.00062697	4.44122319	.12515642
7	WARM TEST	295.75	-1.07582396	.00068264	----------	----------
8	COLD TEST	79.15	-.78611636	.00056120	4.39925980	.11781647
9	WARM TEST	295.75	-1.07524704	.00056579	----------	----------
10	COLD TEST	79.15	-.78921566	.00062382	4.45277252	.26294966
11	WARM TEST	295.75	-1.07560985	.00068579	----------	----------
12	COLD TEST	79.15	-.78756430	.00056619	4.42355572	.12876834
13	WARM TEST	295.75	-1.07564468	.00079763	----------	----------
14	COLD TEST	79.15	-.78769939	.00059402	4.42522020	.33234105
15	WARM TEST	295.75	-1.07560899	.00075158	----------	----------
16	COLD TEST	79.15	-.79298114	.00056566	4.50659919	.26974021
17	WARM TEST	295.75	-1.07570485	.00067446	----------	----------
18	COLD TEST	79.15	-.78684346	.00050213	4.41157071	.08816438
19	WARM TEST	295.75	-1.07551050	.00068776	----------	----------
20	COLD TEST	79.15	-.78906353	.00058958	4.44749371	.13548491

CH. 13 ,15.9 MHz MHz

NOISE FIGURE AVERAGE (dB) = 4.43342500385

NOISE POWER STABILITY (K) = .184451859013

NOISE POWER STABILITY DELTA (K) = .244176675888

NPS_MAX (K) = .332341052078 NPS_MIN (K) = .0881643761892

INTEGRATION TIME = .165

Y. Yuen 3/27/98 (QC 229)

TEST DATA SHEET 10 (Sheet 8 of 18) 30

Noise Figure and Noise Power Stability Test Data (Paragraph 3.5.4) (A1-1)

Test Setup Verified: J. Zuo Signature

Baseplate Temperature (T_B) 30.2 °C

PLO No. 1

PLO #1

Component	Channel No.	V_b(V)	I_b(mA)	T_H(°C)	V_H (V) Mean	V_H (V) Standard Deviation	T_C(°C)	V_C (V) Mean	V_C (V) Standard Deviation
LO	14	Positive 15.07	523.0	22.6	-.8956	.00092	-194.0	-.6562	.00079
				22.6	-.8955	.00088	-194.0	-.6557	.00075
				22.6	-.8963	.00094	-194.0	-.6613	.00077
				22.6	-.8959	.00091	-194.0	-.6605	.00099
				22.6	-.8959	.00087	-194.0	-.6595	.00079
		Negative -15.1	-57.8	22.6	-.8957	.00085	-194.0	-.6587	.00069
				22.6	-.8958	.00088	-194.0	-.6581	.00071
				22.6	-.8956	.00084	-194.0	-.6583	.00078
				22.6	-.8954	.00091	-194.0	-.6586	.00064
				22.6	-.8957	.00089	-194.0	-.6580	.00071
Mixer/ Amps	All	9.93	242.8	[redacted]					
IF Amps	All	7.93	263.2						

Part No.: 1356429-1

Serial No.: F02

Test Engineer: [signature]

Quality Assurance: [signature] (QA 267) AUG 28 '98

Date: 8/18/98

Y. Yuik 8/27/98 QC 229

TEST DATA SHEET 10 (Sheet 23 of 30)

Noise Figure and Noise Power Stability Test Data (Paragraph 3.5.4) (A1-1)

Test Setup Verified: _____ Signature Baseplate Temperature (T_B) 30.2 °C PLO No. 1

PLO #1

Channel No.	NF (dB)				NPS (K)				
	Required (Max)	Measured	Average	Pass/Fail	Required (Max)	Measured	Average	Delta	Pass/Fail
14		4.43				0.14			
		4.43				0.17			
		4.52				0.25			
		4.51				0.09			
		4.49				0.23			
		4.48				0.28			
		4.46				0.21			
		4.47				0.31			
		4.48				0.12			
		4.46				0.15			
	4.7		4.47	P	0.36		0.19	0.216	P

Pass = P, Fail = F

Part No.: 1356429-1

Serial No.: F02

Test Engineer: _____

Quality Assurance: _____ 7A 267 AUG 28 '98

Date: 8/18/98

Y. Yim 3/27/98 (QC 229)

TEST DATA SHEET 10 (Sheet 18 of 18)

Noise Figure and Noise Power Stability Test Data (Paragraph 3.5.4) (A1-1)

Test Setup Verified: J. Yim (Signature) Baseplate Temperature (T_B) 30.2 °C

Channel No.	NF (dB) Required (Max)	NF (dB) Measured	NF (dB) Average	NF (dB) Pass/Fail	NPS (K) Required (Max)	NPS (K) Measured	NPS (K) Average	NPS (K) Delta	NPS (K) Pass/Fail
15		7.38				0.14			
		7.37				0.02			
		7.38				0.10			
		7.41				0.04			
		7.38				0.10			
		7.35				0.05			
		7.36				0.03			
		7.29				0.08			
		7.24				0.10			
		7.22				0.09			
	9.05		7.34	P	0.15		0.07	0.119	P

Pass = P, Fail = F

Part No.: 1356429-1

Serial No.: F02

Test Engineer: [signature]

Quality Assurance:

Date: 8/13/98

FOR REFERENCE ONLY

AMSU-A TEST

AMSU-A1-1, S/N: F02, CH14, PLO #1, NF & NPS TEST DATA, 8/18/98, TB = 30.2 C

SEQ	TEMP_TEST	TEST TEMP	VOLTAGE	STD_DEV	NF (dB)	NPS(K)
1	WARM TEST	295.75	-.89555383	.00091853	----------	----------
2	COLD TEST	79.15	-.65620369	.00079475	4.43226159	.14422373
3	WARM TEST	295.75	-.89547126	.00088400	----------	----------
4	COLD TEST	79.15	-.65574824	.00075323	4.42504956	.17307392
5	WARM TEST	295.75	-.89629733	.00094395	----------	----------
6	COLD TEST	79.15	-.66131434	.00077240	4.51642977	.24628502
7	WARM TEST	295.75	-.89592966	.00091055	----------	----------
8	COLD TEST	79.15	-.66054062	.00098956	4.50708464	.09256965
9	WARM TEST	295.75	-.89587057	.00087028	----------	----------
10	COLD TEST	79.15	-.65948741	.00079229	4.48836448	.22723136
11	WARM TEST	295.75	-.89567108	.00085021	----------	----------
12	COLD TEST	79.15	-.65874266	.00069166	4.47731358	.28275244
13	WARM TEST	295.75	-.89584434	.00087601	----------	----------
14	COLD TEST	79.15	-.65810887	.00071289	4.46328656	.20664627
15	WARM TEST	295.75	-.89555653	.00083902	----------	----------
16	COLD TEST	79.15	-.65828045	.00078265	4.47034105	.30868497
17	WARM TEST	295.75	-.89538273	.00091338	----------	----------
18	COLD TEST	79.15	-.65860028	.00064298	4.47860067	.11667063
19	WARM TEST	295.75	-.89571301	.00088931	----------	----------
20	COLD TEST	79.15	-.65803223	.00070975	4.46365175	.15172859

CH. 14 ,5.94 MHz MHz

NOISE FIGURE AVERAGE (dB) = 4.47232439997

NOISE POWER STABILITY (K) = .194986657629

NOISE POWER STABILITY DELTA (K) = .216115313198

NPS_MAX (K) = .308684965606 NPS_MIN (K) = .0925696524086

INTEGRATION TIME = .165

Y. Trinh 3/27/98 QC 229

9 30

TEST DATA SHEET 10 (Sheet 8 of 18)

Noise Figure and Noise Power Stability Test Data (Paragraph 3.5.4)

Test Setup Verified: Y. Trinh (Signature) Baseplate Temperature (T_B) 30.1 °C PLO No. 2

PLO #2

Component	Channel No.	V_b(V)	I_b(mA)	T_H(°C)	V_H (V) Mean	V_H (V) Standard Deviation	T_C(°C)	V_C (V) Mean	V_C (V) Standard Deviation
LO	9	Positive		22.4	-.8281	.000167	-194.0	-.5838	.000155
				22.4	-.8268	.000186	-194.0	-.5814	.000135
		+15.07	520.9	22.4	-.8278	.000161	-194.0	-.5807	.000179
				22.4	-.8278	.000165	-194.0	-.5814	.000164
				22.4	-.8277	.000192	-194.0	-.5787	.000210
		Negative		22.4	-.8275	.000179	-194.0	-.5794	.000211
		-15.1	Y. Trinh 08/15/98 -67.0	22.4	-.8277	.000164	-194.0	-.5811	.000212
			-66.3	22.4	-.8274	.000206	-194.0	-.5790	.000196
				22.4	-.8275	.000153	-194.0	-.5793	.000163
				22.4	-.8276	.000144	-194.0	-.5797	.000214
Mixer/ Amps	All	9.93	242.8						
IF Amps	All	7.93	263.2						

Part No.: 1356429-1

Serial No.: F02

Test Engineer: Y. Trinh

Quality Assurance: [signature] QA 267 AUG 28 '98

Date: 08/15/98

Y. Trinh 3/27/98 QC 229

10 30

TEST DATA SHEET 10 (Sheet 4 of 18)

Noise Figure and Noise Power Stability Test Data (Paragraph 3.5.4) (A1-1)

Test Setup Verified: Y. Trinh (Signature) Baseplate Temperature (T_B) 30.8 °C PLO No. 2

PLO#2

Component	Channel No.	V_b(V)	I_b(mA)	T_H(°C)	V_H (V) Mean	V_H (V) Standard Deviation	T_C(°C)	V_C (V) Mean	V_C (V) Standard Deviation
LO	10	Positive +15.07	520.0	22.4	-.9822	.000269	-194.0	-.6925	0.000305
				22.4	-.9826	.000297	-194.0	-.6897	.000337
				22.4	-.9837	.000321	-194.0	-.6875	.000282
				22.4	-.9825	.00032	-194.0	-.6867	.000327
				22.4	-.9824	.000276	-194.0	-.6842	.000305
		Negative -15.1	-66.3	22.4	-.9826	.000331	-194.0	-.6852	.000246
				22.4	-.9826	.000271	-194.0	-.6832	.000256
				22.4	-.9827	.000284	-194.0	-.6846	.000271
				22.4	-.9825	.000303	-194.0	-.6830	.000290
				22.4	-.9825	.000235	-194.0	-.6834	.000289
Mixer/ Amps	All	9.93	242.8						
IF Amps	All	7.93	263.2						

Part No.: 1356429-1

Serial No.: F02

Test Engineer: Y. Trinh

Quality Assurance: [signature] QA 267 AUG 28 '98

Date: 08/15/98

Y. Trinh 8/27/98 (QC 229)

TEST DATA SHEET 10 (Sheet 24 of 30)

Noise Figure and Noise Power Stability Test Data (Paragraph 3.5.4) (A1-1)

Test Setup Verified: Y. Trinh (Signature) Baseplate Temperature (T_B) 30.1 °C PLO No. 2

PLO#2

Channel No.	NF (dB) Required (Max)	NF (dB) Measured	NF (dB) Average	NF (dB) Pass/Fail	NPS (K) Required (Max)	NPS (K) Measured	NPS (K) Average	NPS (K) Delta	NPS (K) Pass/Fail
9		4.0				0.032			
		3.97				0.08			
		3.95				0.023			
		3.96				0.023			
		3.91				0.088			
		3.93				0.064			
		3.95				0.017			
		3.92				0.11			
		3.93				0.05			
		3.93				0.066			
	4.7		3.94	P	.08		0.055	0.094	P

Pass = P, Fail = F

Part No.: 1356429-1

Serial No.: F02

Test Engineer: Y. Trinh

Quality Assurance: J. M. Chavez (IA 267) AUG 28 '98

Date: 08/15/98

TEST DATA SHEET 10 (Sheet 11 of 18)

Noise Figure and Noise Power Stability Test Data (Paragraph 3.5.4) (A1-1)

Test Setup Verified:_____ Baseplate Temperature (T_B) _____°C
Signature

Channel No.	NF (dB)				NPS (K)				
	Required (Max)	Measured	Average	Pass/Fail	Required (Max)	Measured	Average	Delta	Pass/Fail
7									
	5.15				.08				

Pass = P, Fail = F

Part No.:_____ Test Engineer:_____

Serial No.:_____ Quality Assurance:_____

Date:_____

AMSU-A TEST

FOR REFERENCE ONLY

AMSU-A1-1, S/N: F02, CH9, PL0 #2, NF & NPS TEST DATA, 8/15/98 $T_B = 30.1\,^{\circ}C$

SEQ	TEMP_TEST	TEST TEMP	VOLTAGE	STD_DEV	NF (dB)	NPS(K)
1	WARM TEST	295.55	-.82807446	.00016730	----------	----------
2	COLD TEST	79.15	-.58376790	.00015512	3.99694893	.03210996
3	WARM TEST	295.55	-.82680601	.00018625	----------	----------
4	COLD TEST	79.15	-.58140893	.00013519	3.97074984	.07935056
5	WARM TEST	295.55	-.82778617	.00016121	----------	----------
6	COLD TEST	79.15	-.58073747	.00017871	3.94657885	.02263308
7	WARM TEST	295.55	-.82778651	.00016544	----------	----------
8	COLD TEST	79.15	-.58138959	.00016386	3.95814207	.02345897
9	WARM TEST	295.55	-.82767950	.00019185	----------	----------
10	COLD TEST	79.15	-.57867898	.00020960	3.91157336	.08759775
11	WARM TEST	295.55	-.82747529	.00017877	----------	----------
12	COLD TEST	79.15	-.57944107	.00021139	3.92751087	.06366220
13	WARM TEST	295.55	-.82768005	.00016433	----------	----------
14	COLD TEST	79.15	-.58105440	.00021151	3.95351843	.01658143
15	WARM TEST	295.55	-.82744832	.00020649	----------	----------
16	COLD TEST	79.15	-.57897786	.00014563	3.91967754	.11018505
17	WARM TEST	295.55	-.82752298	.00015290	----------	----------
18	COLD TEST	79.15	-.57933579	.00016275	3.92506490	.04977882
19	WARM TEST	295.55	-.82758709	.00014437	----------	----------
20	COLD TEST	79.15	-.57968033	.00021367	3.93035191	.06647873

CH. 9 ,155.8 MHz MHz

NOISE FIGURE AVERAGE (dB) = 3.9440840224

NOISE POWER STABILITY (K) = .055183656151

NOISE POWER STABILITY DELTA (K) = .093603283261

NPS_MAX (K) = .110185054799 NPS_MIN (K) = .0165814264733

INTEGRATION TIME = .165

AE-26002/6B
10 June 1998

Y. Trinh 3/27/98 QC 229

TEST DATA SHEET 10 (Sheet 4 of 10 → 18 → 30)

Noise Figure and Noise Power Stability Test Data (Paragraph 3.5.4) (A1-1)

Test Setup Verified: Y. Trinh (Signature) Baseplate Temperature (T_B) 30.8 °C PLO No. 2

PLO#2

Component	Channel No.	V_b(V)	I_b(mA)	T_H(°C)	V_H (V) Mean	V_H (V) Standard Deviation	T_C(°C)	V_C (V) Mean	V_C (V) Standard Deviation
LO	10	Positive +15.07	520.0	22.4	-.9822	.000269	-194.0	-.6925	0.000305
				22.4	-.9826	.000297	-194.0	-.6897	.000337
				22.4	-.9837	.000321	-194.0	-.6875	.000282
				22.4	-.9825	.00032	-194.0	-.6867	.000327
				22.4	-.9824	.000276	-194.0	-.6842	.000305
		Negative -15.1	-66.3	22.4	-.9826	.000331	-194.0	-.6852	.000246
				22.4	-.9826	.000271	-194.0	-.6832	.000256
				22.4	-.9827	.000284	-194.0	-.6846	.000271
				22.4	-.9825	.000303	-194.0	-.6830	.000290
				22.4	-.9825	.000285	-194.0	-.6834	.000239
Mixer/ Amps	All	9.93	242.8						
IF Amps	All	7.93	263.2						

Part No.: 1356429-1

Serial No.: F02

Test Engineer: Y. Trinh

Quality Assurance: [signature] (QA 267) AUG 28 '98

Date: 08/15/98

Y. Trinh 8/27/98 QC 229

TEST DATA SHEET 10 (Sheet 25 of 30)

Noise Figure and Noise Power Stability Test Data (Paragraph 3.5.4) (A1-1)

Test Setup Verified: Y. Trinh (Signature) Baseplate Temperature (T_B) 30.8 °C PLO No. 2

PLO#2

Channel No.	NF (dB)				NPS (K)				
	Required (Max)	Measured	Average	Pass/Fail	Required (Max)	Measured	Average	Delta	Pass/Fail
10		4.0				0.044			
		3.95				0.081			
		3.91				0.12			
		3.91				0.12			
		3.87				0.016			
		3.89				0.13			
		3.86				0.036			
		3.88				0.05			
		3.85				0.092			
		3.86				0.051			
	4.7		3.90	P	0.12		0.074	0.12	P

Pass = P, Fail = F

Part No.: 1356429-1

Serial No.: F02

Test Engineer: Y. Trinh

Quality Assurance: JM Oliveira (QA 267) AUG 28 '98

Date: 08/15/98

Y. Trinh QC 229
8/20/98

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TEST DATA SHEET 10 (Sheet 14 of 18)

Noise Figure and Noise Power Stability Test Data (Paragraph 3.5.4) (A1-1)

Test Setup Verified: Y. Trinh (Signature) Baseplate Temperature (T_B) 30.8 °C PLO NO. 2

PLO #2

Channel No.	NF (dB) Required (Max)	NF (dB) Measured	NF (dB) Average	NF (dB) Pass/Fail	NPS (K) Required (Max)	NPS (K) Measured	NPS (K) Average	NPS (K) Delta	NPS (K) Pass/Fail
11		4.01				0.059			
		4.0				0.10			
		4.0				0.11			
		3.98				0.11			
		3.99				0.10			
		3.98				0.03			
		3.98				0.048			
		3.98				0.03			
		3.96				0.098			
		3.98				0.087			
	4.7		3.99	P	.12		0.077	0.081	P

Pass = P, Fail = F

Part No.: 1356429-1

Serial No.: F02

Test Engineer: Y. Trinh

Quality Assurance: JM Chavez (QA 267) AUG 28 '98

Date: 08/20/98

FOR REFERENCE ONLY

AMSU-A TEST

AMSU-A1-1, S/N: F02, CH10, PL0 #2, NF & NPS TEST DATA, 8/15/98 $\frac{TB}{30.8}$ °C

SEQ	TEMP_TEST	TEST TEMP	VOLTAGE	STD_DEV	NF (dB)	NPS(K)
1	WARM TEST	295.55	-.98223923	.00026918	----------	---------
2	COLD TEST	79.15	-.69247659	.00030454	3.99735819	.04404566
3	WARM TEST	295.55	-.98256459	.00029659	----------	---------
4	COLD TEST	79.15	-.68973718	.00033706	3.95276402	.08086748
5	WARM TEST	295.55	-.98372795	.00032117	----------	---------
6	COLD TEST	79.15	-.68745864	.00026216	3.90680051	.11998583
7	WARM TEST	295.55	-.98250630	.00031976	----------	---------
8	COLD TEST	79.15	-.68672126	.00032694	3.90852167	.11857771
9	WARM TEST	295.55	-.98242133	.00027648	----------	---------
10	COLD TEST	79.15	-.68417705	.00030547	3.87190305	.01584085
11	WARM TEST	295.55	-.98259120	.00033097	----------	---------
12	COLD TEST	79.15	-.68519642	.00024613	3.88514466	.13328476
13	WARM TEST	295.55	-.98261803	.00027120	----------	---------
14	COLD TEST	79.15	-.68324458	.00025582	3.85623875	.03575491
15	WARM TEST	295.55	-.98266754	.00028401	----------	---------
16	COLD TEST	79.15	-.68463648	.00027073	3.87613012	.04956411
17	WARM TEST	295.55	-.98247815	.00030341	----------	---------
18	COLD TEST	79.15	-.68300174	.00029041	3.85411050	.09164340
19	WARM TEST	295.55	-.98252192	.00028457	----------	---------
20	COLD TEST	79.15	-.68336968	.00028900	3.85904604	.05112857

CH. 10 ,77 MHz MHz

NOISE FIGURE AVERAGE (dB) = 3.89702777028

NOISE POWER STABILITY (K) = .0740693277995

NOISE POWER STABILITY DELTA (K) = .117443314517

NPS_MAX (K) = .133284760015 NPS_MIN (K) = .0158408454983

INTEGRATION TIME = .165

Y. Trinh 8/27/98 QC 229

TEST DATA SHEET 10 (Sheet 5 of 18) 11 30

Noise Figure and Noise Power Stability Test Data (Paragraph 3.5.4) (A1-1)

Test Setup Verified: Y. Trinh (Signature) Baseplate Temperature (T_B) 30.8 °C PLO No. 2

PLO#2

Component	Channel No.	V_b(V)	I_b(mA)	T_H(°C)	V_H (V) Mean	V_H (V) Standard Deviation	T_C(°C)	V_C (V) Mean	V_C (V) Standard Deviation
LO	11	Positive +15.1	525.0	22.6	-1.00	0.000284	-194.0	-.7081	.000238
				22.6	-1.00	.000326	-194.0	-.7066	.000210
				22.6	-1.00	.000329	-194.0	-.7065	.000198
				22.6	-1.00	.000332	-194.0	-.7049	.000225
				22.6	-1.00	.000261	-194.0	-.7054	.000218
		Negative -15.1	-67.0	22.6	-1.00	.000298	-194.0	-.7047	.000203
				22.6	-1.00	.000287	-194.0	-.7043	.000208
				22.6	-1.00	.000297	-194.0	-.7039	.000237
				22.6	-1.00	.000262	-194.0	-.7026	.000198
				22.6	-1.00	.000317	-194.0	-.7041	.000232
Mixer/ Amps	All	9.9	243.0						
IF Amps	All	7.9	266A						

Part No.: 1356429-1

Serial No.: F02

Test Engineer: Y. Trinh

Quality Assurance: [signature] QA 267 AUG 28 '98

Date: 08/20/98

Y. Yuen 8/27/98 (QC 229)

TEST DATA SHEET 10 (Sheet 6 of 18) 12 30

Noise Figure and Noise Power Stability Test Data (Paragraph 3.5.4) (A1-1)

Test Setup Verified: Y. Yuen Signature Baseplate Temperature (T_E) 30.8 °C PLO No. 2

PLO #2

Component	Channel No.	V_b(V)	I_b(mA)	T_H(°C)	V_H (V) Mean	V_H (V) Standard Deviation	T_C(°C)	V_C (V) Mean	V_C (V) Standard Deviation
LO	12	Positive 15.1	525.0	22.6	-.9316	.000372	-194.0	-.6557	.000324
				22.6	-.9351	.00042	-194.0	-.6569	.000321
				22.6	-.9338	.000394	-194.0	-.6558	.000312
				22.6	-.9329	.000464	-194.0	-.6538	.000344
				22.6	-.9325	.000492	-194.0	-.6556	0.000373
		Negative -15.1	-67.0	22.6	-.9324	.000488	-194.0	-.6548	.000286
				22.6	-.9324	.00042	-194.0	-.6553	.000325
				22.6	-.9323	.000385	-194.0	-.6561	.00028
				22.6	-.9322	.00041	-194.0	-.6548	.00025
				22.6	-.9318	.000391	-194.0	-.6542	.000323
Mixer/ Amps	All	9.9	243.0	[redacted]					
IF Amps	All	7.9	266.4						

Part No.: 1356429-1

Serial No.: F02

Test Engineer: Y. Yuen

Quality Assurance: [signature] (QA 267) ADC 28 '98

Date: 08/20/98

AE-26002/6B
10 June 1998

Y. Trinh QC 229 8/27/98

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TEST DATA SHEET 10 (Sheet 14 of 18)

Noise Figure and Noise Power Stability Test Data (Paragraph 3.5.4) (A1-1)

Test Setup Verified: Y. Trinh (Signature) Baseplate Temperature (T_B) 30.8 °C PLO NO. 2

PLO #2

Channel No.	NF (dB) Required (Max)	NF (dB) Measured	NF (dB) Average	NF (dB) Pass/Fail	NPS (K) Required (Max)	NPS (K) Measured	NPS (K) Average	NPS (K) Delta	NPS (K) Pass/Fail
11		4.01				0.059			
		4.0				0.10			
		4.0				0.11			
		3.98				0.11			
		3.99				0.10			
		3.98				0.03			
		3.98				0.048			
		3.98				0.03			
		3.96				0.098			
		3.98				0.087			
	4.7		3.99	P	.12		0.077	0.081	P

Pass = P, Fail = F

Part No.: 1356429-1

Serial No.: F02

Test Engineer: Y. Trinh

Quality Assurance: J. McChesney TA 267 AUG 28 '98

Date: 08/20/98

AMSU-A TEST

FOR REFERENCE ONLY

AMSU-A1-1, S/N: F02, CH11, PLO #2, NF & NPS TEST DATA, 8/20/98, TB = 30.8 C

SEQ	TEMP_TEST	TEST TEMP	VOLTAGE	STD_DEV	NF (dB)	NPS(K)
1	WARM TEST	295.75	-1.00390904	.00028439	----------	---------
2	COLD TEST	79.15	-.70814524	.00023841	4.00599853	.05906519
3	WARM TEST	295.75	-1.00273375	.00032612	----------	---------
4	COLD TEST	79.15	-.70662587	.00021049	3.99578175	.10129682
5	WARM TEST	295.75	-1.00206434	.00032888	----------	---------
6	COLD TEST	79.15	-.70651257	.00019821	4.00108696	.10645139
7	WARM TEST	295.75	-1.00165929	.00033181	----------	---------
8	COLD TEST	79.15	-.70487223	.00022503	3.98105999	.11093341
9	WARM TEST	295.75	-1.00136518	.00026114	----------	---------
10	COLD TEST	79.15	-.70544161	.00021789	3.99252880	.10021930
11	WARM TEST	295.75	-1.00099162	.00029767	----------	---------
12	COLD TEST	79.15	-.70465445	.00020305	3.98478180	.03042460
13	WARM TEST	295.75	-1.00074525	.00028723	----------	---------
14	COLD TEST	79.15	-.70430012	.00020793	3.98210990	.04810109
15	WARM TEST	295.75	-1.00049873	.00029745	----------	---------
16	COLD TEST	79.15	-.70385910	.00023692	3.97816026	.02995859
17	WARM TEST	295.75	-1.00002502	.00026226	----------	---------
18	COLD TEST	79.15	-.70260306	.00019816	3.96455771	.09751562
19	WARM TEST	295.75	-.99987000	.00031734	----------	---------
20	COLD TEST	79.15	-.70406501	.00023178	3.98774241	.08671243

CH. 11 ,89.9 MHz MHz

NOISE FIGURE AVERAGE (dB) = 3.98739591535

NOISE POWER STABILITY (K) = .077067845267

NOISE POWER STABILITY DELTA (K) = .0809748200856

NPS_MAX (K) = .110933412067 NPS_MIN (K) = .029958591981

INTEGRATION TIME = .165

Y. Yuh 8/27/98 (QC 229)

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TEST DATA SHEET, 10 (Sheet 6 of 18)

Noise Figure and Noise Power Stability Test Data (Paragraph 3.5.4) (A1-1)

Test Setup Verified: Y. Yuh (Signature) Baseplate Temperature (T_B) 30.8 °C PLO No. 2

PLO #2

Component	Channel No.	V_b(V)	I_b(mA)	T_H(°C)	V_H (V) Mean	V_H (V) Standard Deviation	T_C(°C)	V_C (V) Mean	V_C (V) Standard Deviation
LO	12	Positive 15.1	525.0	22.6	-.9316	.000372	-194.0	-.6557	.000324
				22.6	-.9351	.00042	-194.0	-.6569	.000321
				22.6	-.9338	.000394	-194.0	-.6558	.000312
				22.6	-.9329	.000464	-194.0	-.6538	.000394
				22.6	-.9325	.000492	-194.0	-.6556	0.000373
		Negative -15.1	-67.0	22.6	-.9324	.000488	-194.0	-.6548	.000286
				22.6	-.9324	.00042	-194.0	-.6553	.000325
				22.6	-.9323	.000385	-194.0	-.6561	.00028
				22.6	-.9322	.00041	-194.0	-.6548	.00025
				22.6	-.9318	.000391	-194.0	-.6542	.000323
Mixer/ Amps	All	9.9	243.0						
IF Amps	All	7.9	266.4						

Part No.: 1356429-1

Serial No.: F02

Test Engineer: Y. Yuh

Quality Assurance: (QA 267) AUG 28 '98

Date: 08/20/98

Y. Yrink 8/27/93 (CC 229)

TEST DATA SHEET 10 (Sheet 15 of 18)

Noise Figure and Noise Power Stability Test Data (Paragraph 3.5.4) (A1-1)

Test Setup Verified: Y. Yrink (Signature) Baseplate Temperature (T_B) 30.8 °C PLO No. 2

PLO #2

Channel No.	NF (dB)				NPS (K)				
	Required (Max)	Measured	Average	Pass/Fail	Required (Max)	Measured	Average	Delta	Pass/Fail
12		3.98				0.14			
		3.96				0.062			
		3.96				0.095			
		3.94				0.17			
		3.97				0.21			
		3.96				0.20			
		3.97				0.064			
		3.98				0.11			
		3.96				0.031			
		3.96				0.099			
	4.7		3.96	P	0.18		0.12	0.18	P

Pass = P, Fail = F

Part No.: 1356429-1

Serial No.: F02

Test Engineer: Y. Yrink

Quality Assurance: Jm Chavez (7A 267) AUG 28 '98

Date: 08/20/98

Y. Trinh 3/27/98 QC 229

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TEST DATA SHEET 10 (Sheet 16 of 18)

Noise Figure and Noise Power Stability Test Data (Paragraph 3.5.4) (A1-1)

Test Setup Verified: Y. Trinh (Signature) Baseplate Temperature (T_B) 31.0 °C PLO No. 2

PLO #2

Channel No.	NF (dB)				NPS (K)				
	Required (Max)	Measured	Average	Pass/Fail	Required (Max)	Measured	Average	Delta	Pass/Fail
13		3.96				0.073			
		3.97				0.15 08/20/98 Y. Trinh			
		3.96				0.14			
		3.95				0.077			
		3.93				0.088			
		3.94				0.17			
		3.95				0.15			
		3.98				0.079			
		3.98				0.24			
		3.95				0.18			
	4.7		3.96	P	0.24		0.14	0.17	P

Pass = P, Fail = F

Part No.: 1356429-1

Serial No.: F02

Test Engineer: Y. Trinh

Quality Assurance: JM Chiarra (QA 267) AUG 28 '98

Date: 08/20/98

FOR REFERENCE ONLY

AMSU-A TEST

AMSU-A1-1, S/N: F02, CH12, PLO #2, NF & NPS TEST DATA, 8/20/98, TB = 30.8 C

SEQ	TEMP_TEST	TEST TEMP	VOLTAGE	STD_DEV	NF (dB)	NPS(K)
1	WARM TEST	295.75	-.93162710	.00037216	----------	---------
2	COLD TEST	79.15	-.65569439	.00032425	3.98271165	.13739525
3	WARM TEST	295.75	-.93510739	.00042046	----------	---------
4	COLD TEST	79.15	-.65688481	.00032138	3.96285714	.06219474
5	WARM TEST	295.75	-.93381661	.00039384	----------	---------
6	COLD TEST	79.15	-.65578318	.00031216	3.95978755	.09483866
7	WARM TEST	295.75	-.93289632	.00046369	----------	---------
8	COLD TEST	79.15	-.65378759	.00034388	3.93857307	.16536491
9	WARM TEST	295.75	-.93251114	.00049182	----------	---------
10	COLD TEST	79.15	-.65561426	.00037262	3.97159456	.21052497
11	WARM TEST	295.75	-.93244687	.00048811	----------	---------
12	COLD TEST	79.15	-.65482745	.00028632	3.95988500	.20467200
13	WARM TEST	295.75	-.93242241	.00041970	----------	---------
14	COLD TEST	79.15	-.65532730	.00032499	3.96804540	.06408812
15	WARM TEST	295.75	-.93232552	.00038470	----------	---------
16	COLD TEST	79.15	-.65607145	.00027996	3.98089701	.11469841
17	WARM TEST	295.75	-.93215980	.00041341	----------	---------
18	COLD TEST	79.15	-.65481784	.00025020	3.96291433	.03101003
19	WARM TEST	295.75	-.93184270	.00039140	----------	---------
20	COLD TEST	79.15	-.65424429	.00032316	3.95737898	.09876482

CH. 12 ,31.1 MHz MHz

NOISE FIGURE AVERAGE (dB) = 3.96448098779

NOISE POWER STABILITY (K) = .118355190644

NOISE POWER STABILITY DELTA (K) = .179514332181

NPS_MAX (K) = .210524965969 NPS_MIN (K) = .0310100337873

INTEGRATION TIME = .165

Y. Yrizarry 3/27/98 (QC 229)

TEST DATA SHEET 10 (Sheet 13 of 30)

Noise Figure and Noise Power Stability Test Data (Paragraph 3.5.4) (A1-1)

Test Setup Verified: Y. Yrizarry (Signature) Baseplate Temperature (T_B) 31.0 °C PLO No. 2 PLO #2

Component	Channel No.	V_b(V)	I_b(mA)	T_H(°C)	V_H (V) Mean	V_H (V) Standard Deviation	T_C(°C)	V_C (V) Mean	V_C (V) Standard Deviation
LO	13	Positive 15.1	525.0	22.6	-1.08	.000655	-194.0	-.7551	.000499
				22.6	-1.07	.000699	-194.0	-.7543	.000427
				22.6	-1.07	.000628	-194.0	-.7543	.000508
				22.6	-1.07	.000652	-194.0	-.7521	.000444
				22.6	-1.07	.000675	-194.0	-.7513	.000452
		Negative -15.1	-67.0	22.6	-1.07	.00061	-194.0	-.7518	.000449
				22.6	-1.07	.000626	-194.0	-.7524	.00040
				22.6	-1.07	.000673	-194.0	-.7551	.000432
				22.6	-1.07	.000752	-194.0	-.7554	.000484
				22.6	-1.07	.000715	-194.0	-.7539	.000476
Mixer/ Amps	All	9.9	243.0						
IF Amps	All	7.9	266.4						

Part No.: 1356429-1

Serial No.: F02

Test Engineer: Y. Yrizarry

Quality Assurance: (QA 267) AUG 28 '98

Date: 08/20/98

Y. Trinh 8/27/98 (QC 229)

14 30

TEST DATA SHEET 10 (Sheet 8 of 18)

Noise Figure and Noise Power Stability Test Data (Paragraph 3.5.4) (A1-1)

Test Setup Verified: Y. Trinh (Signature) Baseplate Temperature (T_I) 31.1 °C PLO No. 2

PLO #2

Component	Channel No.	V_b(V)	I_b(mA)	T_H(°C)	V_H (V) Mean	V_H (V) Standard Deviation	T_C(°C)	V_C (V) Mean	V_C (V) Standard Deviation
LO	14	Positive 15.1	Y. Trinh 03/20/98 525.0	22.6	-.8919	.000977	-194.0	-.6253	.000657
				22.6	-.8924	.00092	-194.0	-.6271	.000621
				22.6	-.8919	.000978	-194.0	-.6260	.000689
				22.6	-.8917	.000842	-194.0	-.6253	.000622
				22.6	-.8921	.000877	-194.0	-.6243	.000593
		Negative -15.1	-67.0	22.6	-.8919	.000945	-194.0	-.6247	.000648
				22.6	-.8919	.000918	-194.0	-.6253	.000610
				22.6	-.8916	.000854	-194.0	-.6239	.000660
				22.6	-.8917	.000951	-194.0	-.6245	.000614
				22.6	-.8917	.000893	-194.0	-.6253	.000629
Mixer/ Amps	All	9.9	243.0	[redacted]					
IF Amps	All	7.9	266.4						

Part No.: 1356429-1

Serial No.: F02

Test Engineer: Y. Trinh

Quality Assurance: (QA 267) AUG 28 98

Date: 08/20/98

AE-26002/6B
10 June 1998

Y. Yrink QC 229
3/27/98

TEST DATA SHEET 10 (Sheet 16 of 18) 28 30

Noise Figure and Noise Power Stability Test Data (Paragraph 3.5.4) (A1-1)

Test Setup Verified: Y. Yrink (Signature) Baseplate Temperature (T_B) 31.0 °C PLO No. 2

PLO#2

Channel No.	NF (dB)				NPS (K)				
	Required (Max)	Measured	Average	Pass/Fail	Required (Max)	Measured	Average	Delta	Pass/Fail
13		3.96				0.073			
		3.97				0.15 08 Y. Yrink 08/20/98			
		3.96				0.14			
		3.95				0.077			
		3.93				0.088			
		3.94				0.17			
		3.95				0.15			
		3.98				0.079			
		3.98				0.24			
		3.95				0.18			
	4.7		3.96	P	0.24		0.14	0.17	P

Pass = P, Fail = F

Part No.: 1356429-1

Serial No.: F02

Test Engineer: Y. Yrink

Quality Assurance: JM Chavira (TA 267) AUG 28 '98

Date: 08/20/98

FOR REFERENCE ONLY

AMSU-A TEST

AMSU-A1-1, S/N: F02, CH13, PLO #2, NF & NPS TEST DATA, 8/20/98, TB = 31.0 C

SEQ	TEMP_TEST	TEST TEMP	VOLTAGE	STD_DEV	NF (dB)	NPS(K)
1	WARM TEST	295.75	-1.07533301	.00065540	----------	---------
2	COLD TEST	79.15	-.75507098	.00049924	3.95850686	.07161901
3	WARM TEST	295.75	-1.07346786	.00069923	----------	---------
4	COLD TEST	79.15	-.75429376	.00042722	3.96580321	.15126077
5	WARM TEST	295.75	-1.07285601	.00062795	----------	---------
6	COLD TEST	79.15	-.75345106	.00050784	3.96014244	.14290894
7	WARM TEST	295.75	-1.07253310	.00065231	----------	---------
8	COLD TEST	79.15	-.75213844	.00044448	3.94528124	.07695863
9	WARM TEST	295.75	-1.07263662	.00067501	----------	---------
10	COLD TEST	79.15	-.75134881	.00044970	3.93351712	.08813231
11	WARM TEST	295.75	-1.07290343	.00060973	----------	---------
12	COLD TEST	79.15	-.75175292	.00044917	3.93647715	.17458169
13	WARM TEST	295.75	-1.07289015	.00062618	----------	---------
14	COLD TEST	79.15	-.75243237	.00040001	3.94587601	.14599482
15	WARM TEST	295.75	-1.07340469	.00067292	----------	---------
16	COLD TEST	79.15	-.75514475	.00043157	3.97810131	.07948827
17	WARM TEST	295.75	-1.07344395	.00075209	----------	---------
18	COLD TEST	79.15	-.75544885	.00048415	3.98190554	.24218416
19	WARM TEST	295.75	-1.07418672	.00071522	----------	---------
20	COLD TEST	79.15	-.75392701	.00047560	3.95386958	.18111042

CH. 13 ,15.9 MHz MHz

NOISE FIGURE AVERAGE (dB) = 3.95597554185

NOISE POWER STABILITY (K) = .135423901183

NOISE POWER STABILITY DELTA (K) = .170563154056

NPS_MAX (K) = .242184160266 NPS_MIN (K) = .0716190062098

INTEGRATION TIME = .165

Y. Trinh 8/27/98 (QC 229)

TEST DATA SHEET 10 (Sheet 14 of 30)

Noise Figure and Noise Power Stability Test Data (Paragraph 3.5.4) (A1-1)

Test Setup Verified: Y. Trinh (Signature) Baseplate Temperature (T_B) 31.1 °C PLO No. 2

PLO#2

Component	Channel No.	V_b(V)	I_b(mA)	T_H(°C)	V_H (V) Mean	V_H (V) Standard Deviation	T_C(°C)	V_C (V) Mean	V_C (V) Standard Deviation
LO	14	Positive 15.1	Y. Trinh 03/20/98 ~~525.0~~ 525.0	22.6	-.8919	.000977	-194.0	-.6253	.000657
				22.6	-.8924	.00092	-194.0	-.6271	.000621
				22.6	-.8919	.000978	-194.0	-.6260	.000689
				22.6	-.8917	.000842	-194.0	-.6253	.000622
				22.6	-.8921	.000877	-194.0	-.6243	.000593
		Negative -15.1	-67.0	22.6	-.8919	.000945	-194.0	-.6247	.000648
				22.6	-.8919	.000918	-194.0	-.6253	.000610
				22.6	-.8916	.000859	-194.0	-.6239	.000660
				22.6	-.8917	.000951	-194.0	-.6245	.000614
				22.6	-.8917	.000893	-194.0	-.6253	.000629
Mixer/ Amps	All	9.9	243.0						
IF Amps	All	7.9	266.4						

Part No.: 1356429-1

Serial No.: F02

Test Engineer: Y. Trinh

Quality Assurance: (QA 267) AUG 28 98

Date: 08/20/98

Y. Trinh 3/27/98 QC 229

29 30 30

TEST DATA SHEET 10 (Sheet 17 of 18)

Noise Figure and Noise Power Stability Test Data (Paragraph 3.5.4) (A1-1)

Test Setup Verified: Y. Trinh (Signature) Baseplate Temperature (T_B) 31.1 °C PLO No. 2

PLO #2

Channel No.	NF (dB)				NPS (K)				
	Required (Max)	Measured	Average	Pass/Fail	Required (Max)	Measured	Average	Delta	Pass/Fail
14		3.94				0.30			
		3.97				0.14			
		3.95				0.30			
		3.95				0.27			
		3.92				0.18			
		3.93				0.22			
		3.94				0.13			
		3.92				0.24			
		3.93				0.24			
		3.95				0.11			
	4.7		3.94	P	0.36		0.21	0.19	P

Pass = P, Fail = F

Part No.: 1356429-1

Serial No.: F02

Test Engineer: Y. Trinh

Quality Assurance: (QA 257) AUG 28 '98

Date: 08/20/98

TEST DATA SHEET 10 (Sheet 18 of 18)
Noise Figure and Noise Power Stability Test Data (Paragraph 3.5.4) (A1-1)

Test Setup Verified:_____ Baseplate Temperature (T_B) _____°C
Signature

Channel No.	NF (dB)				NPS (K)				
	Required (Max)	Measured	Average	Pass/Fail	Required (Max)	Measured	Average	Delta	Pass/Fail
15						N/A			
	9.05				0.15				

Pass = P, Fail = F

QC 229 8/28/98

Part No.:_____ Test Engineer:_____

Serial No.:_____ Quality Assurance:_____

Date:_____

FOR REFERENCE ONLY

AMSU-A TEST

AMSU-A1-1, S/N: F02, CH14, PLO #2, NF & NPS TEST DATA, 8/20/98, TB = 31.1 C

SEQ	TEMP_TEST	TEST TEMP	VOLTAGE	STD_DEV	NF (dB)	NPS(K)
1	WARM TEST	295.75	-.89192738	.00097686	----------	---------
2	COLD TEST	79.15	-.62525611	.00065715	3.94152970	.30070753
3	WARM TEST	295.75	-.89243266	.00091963	----------	---------
4	COLD TEST	79.15	-.62708747	.00062064	3.96583186	.13563956
5	WARM TEST	295.75	-.89185212	.00097790	----------	---------
6	COLD TEST	79.15	-.62598313	.00068943	3.95435028	.30398619
7	WARM TEST	295.75	-.89166163	.00084169	----------	---------
8	COLD TEST	79.15	-.62534777	.00062160	3.94609837	.26760998
9	WARM TEST	295.75	-.89213061	.00087671	----------	---------
10	COLD TEST	79.15	-.62430481	.00059294	3.92361493	.17891056
11	WARM TEST	295.75	-.89189748	.00094480	----------	---------
12	COLD TEST	79.15	-.62466889	.00064804	3.93224355	.22273796
13	WARM TEST	295.75	-.89187933	.00091774	----------	---------
14	COLD TEST	79.15	-.62530663	.00061041	3.94291233	.12885661
15	WARM TEST	295.75	-.89159945	.00085431	----------	---------
16	COLD TEST	79.15	-.62388938	.00065962	3.92289979	.23830250
17	WARM TEST	295.75	-.89174716	.00095100	----------	---------
18	COLD TEST	79.15	-.62446660	.00061443	3.93065431	.23977123
19	WARM TEST	295.75	-.89168643	.00089328	----------	---------
20	COLD TEST	79.15	-.62533778	.00062865	3.94564628	.11148288

CH. 14 ,5.9 MHz MHz

NOISE FIGURE AVERAGE (dB) = 3.940597037

NOISE POWER STABILITY (K) = .212800498412

NOISE POWER STABILITY DELTA (K) = .192503309454

NPS_MAX (K) = .303986186756 NPS_MIN (K) = .111482877302

INTEGRATION TIME = .165

Y. Trinh 8/27/98 (QC 229)

TEST DATA SHEET 10 (Sheet 15 of 30)

Noise Figure and Noise Power Stability Test Data (Paragraph 3.5.4) (A1-1)

Test Setup Verified: Y. Trinh (Signature) Baseplate Temperature (T_B) 30.2 °C

Component	Channel No.	V_b(V)	I_b(mA)	T_H(°C)	V_H (V) Mean	V_H (V) Standard Deviation	T_C(°C)	V_C (V) Mean	V_C (V) Standard Deviation
LO	15	14.87	179.8	22.4	-.90019	.00010	-194.0	-.77781	.00025
				22.4	-.89835	.00007	-194.0	-.79533	.00007
				22.4	-.89641	.00009	-194.0	-.77464	.00016
				22.4	-.89590	.00007	-194.0	-.77507	.00020
				22.4	-.89558	.00009	-194.0	-.77390	.00023
				22.4	-.89506	.00008	-194.0	-.77262	.00020
				22.4	-.89440	.00007	-194.0	-.77223	.00022
				22.4	-.89398	.00008	-194.0	-.76995	.00016
				22.4	-.89365	.00009	-194.0	-.76832	.00011
				22.4	-.89344	.00009	-194.0	-.76758	.00008
Mixer/ Amps	All								
IF Amps	All								

Part No.: 1356429-1

Serial No.: F02

Test Engineer: Y. Trinh

Quality Assurance: (QA 267) AUG 28 '98

Date: 08/27/98

5/27/98 QC 229

TEST DATA SHEET 10 (Sheet ~~10~~ 14 of ~~18~~ 30)

Noise Figure and Noise Power Stability Test Data (Paragraph 3.5.4) (A1-1)

Test Setup Verified:_____ Baseplate Temperature (T_B) _____°C
Signature

Channel No.	NF (dB) Required (Max)	NF (dB) Measured	NF (dB) Average	NF (dB) Pass/Fail	NPS (K) Required (Max)	NPS (K) Measured	NPS (K) Average	NPS (K) Delta	NPS (K) Pass/Fail
6									
	5.15				.08				

Pass = P, Fail = F

Part No.:_____ Test Engineer:_____

Serial No.:_____ Quality Assuran :e:_____

Date:_____

Y. Trinh 5/27/98 (QC 229)

TEST DATA SHEET 10 (Sheet ~~18~~ 30 of ~~18~~ 30)

Noise Figure and Noise Power Stability Test Data (Paragraph 3.5.4) (A1-1)

Test Setup Verified: Y. Trinh (Signature) Baseplate Temperature (T_B) 30.2 °C

Channel No.	NF (dB)				NPS (K)				
	Required (Max)	Measured	Average	Pass/Fail	Required (Max)	Measured	Average	Delta	Pass/Fail
15		7.38				0.14			
		7.37				0.02			
		7.38				0.10			
		7.41				0.01			
		7.38				0.10			
		7.35				0.05			
		7.36				0.03			
		7.29				0.08			
		7.24				0.10			
		7.22				0.09			
	9.05		7.34	P	0.15		0.07	0.119	P

Pass = P, Fail = F

Part No.: 1356429-1

Serial No.: F02

Test Engineer: Y. Trinh

Quality Assurance: (TA 267) AUG 28 '98

Date: 08/13/98

FOR REFERENCE ONLY

AMSU-A TEST

AMSU-A1-1, CH15, S/N: F02, NF & NPS TEST DATA, 8/13/98 $T_B = 30.2\,^{\circ}C$

SEQ	TEMP_TEST	TEST TEMP	VOLTAGE	STD_DEV	NF (dB)	NPS(K)
1	WARM TEST	295.55	-.90013529	.00010507	----------	---------
2	COLD TEST	79.15	-.77780562	.00025143	7.38118876	.13747052
3	WARM TEST	295.55	-.89835010	.00007135	----------	---------
4	COLD TEST	79.15	-.77583104	.00007321	7.36579509	.01855624
5	WARM TEST	295.55	-.89640787	.00008925	----------	---------
6	COLD TEST	79.15	-.77463689	.00016404	7.38305379	.09744797
7	WARM TEST	295.55	-.89590339	.00007358	----------	---------
8	COLD TEST	79.15	-.77507065	.00020184	7.41430929	.03841288
9	WARM TEST	295.55	-.89557532	.00009123	----------	---------
10	COLD TEST	79.15	-.77390268	.00022615	7.38252575	.10330502
11	WARM TEST	295.55	-.89505771	.00007542	----------	---------
12	COLD TEST	79.15	-.77261790	.00020211	7.35261296	.04819862
13	WARM TEST	295.55	-.89440052	.00007271	----------	---------
14	COLD TEST	79.15	-.77222909	.00021516	7.35897528	.03312436
15	WARM TEST	295.55	-.89397863	.00008488	----------	---------
16	COLD TEST	79.15	-.76995142	.00016268	7.29121364	.08316157
17	WARM TEST	295.55	-.89365342	.00009011	----------	---------
18	COLD TEST	79.15	-.76832119	.00011333	7.24400660	.09754409
19	WARM TEST	295.55	-.89344250	.00008645	----------	---------
20	COLD TEST	79.15	-.76757911	.00008250	7.22454462	.08678260

CH. 15 ,982 MHz MHz

NOISE FIGURE AVERAGE (dB) = 7.34024679005

NOISE POWER STABILITY (K) = .0744003861454

NOISE POWER STABILITY DELTA (K) = .118914276634

NPS_MAX (K) = .137470518704 NPS_MIN (K) = .0185562420694

INTEGRATION TIME = .165

Y. Yuriko 3/27/98 (QC 229)

TEST DATA SHEET 16

Temperature Sensor and Thermistor Test Data (Paragraph 3.6.1) (A1-1)

Test Setup Verified: T. Thuong (Signature) Baseplate Temperature (T_B) 23.1 °C

Reference Designation	Specification	Measured Value		Pass/Fail
RT 40	2200 ± 100 Ω	2175	Ω	P
RT 45	2200 ± 100 Ω	2175	Ω	P
RT 11	2200 ± 100 Ω	2172	Ω	P
RT 13	2200 ± 100 Ω	2172	Ω	P
RT 15	2200 ± 100 Ω	2174	Ω	P
RT 14	2200 ± 100 Ω	2172	Ω	P
RT 20	2200 ± 100 Ω	2174	Ω	P
RT 21	2200 ± 100 Ω	2178	Ω	P
RT 23	2200 ± 100 Ω	2172	Ω	P
RT 24	2200 ± 100 Ω	2173	Ω	P
RT 25	2200 ± 100 Ω	2176	Ω	P
RT 26	2200 ± 100 Ω	2178	Ω	P
RT 27	2200 ± 100 Ω	2174	Ω	P
RT 28	2200 ± 100 Ω	2177	Ω	P
RT 29	2200 ± 100 Ω	2178	Ω	P
RT 30	2200 ± 100 Ω	2179	Ω	P
RT 31	2200 ± 100 Ω	2178	Ω	P
RT 34	2200 ± 100 Ω	2174	Ω	P
TB 56	3000 ± 100 Ω	2994	Ω	P
TB 57	3000 ± 100 Ω	3001	Ω	P
TB 53	4.1 – 4.6 V	4.35	V	P

Pass = P, Fail = F

Part No.: 1356429-1

Serial No.: F02

Test Engineer: [signature]

Quality Assurance: [signature] (QA 267) AUG 28 '98

Date: 8/11/98

Y. Yurkii 8/27/98 (QC 229)

TEST DATA SHEET 15

Tunable Short Test Data (Paragraph 3.5.5) (A2)

Test Setup Verified:_____ Baseplate Temperature (T_B) _____°C
Signature

Channel No.	Measured Value
1	T_H _____°C V_H _____ mV T_C _____°C V_C _____ mV
Voltage (mV)	____ ____ ____ ____ ____ ____ ____ ____ ____ ____
Position (mil)	____ ____ ____ ____ ____ ____ ____ ____ ____ ____
ΔT	_____ K Required Value* _____ K max Pass/Fail _____
2	T_H _____°C V_H _____ mV T_C _____°C V_C _____ mV
Voltage (mV)	____ ____ ____ ____ ____ ____ ____ ____ ____ ____
Position (mil)	____ ____ ____ ____ ____ ____ ____ ____ ____ ____
ΔT	_____ K Required Value* _____ K max Pass/Fail _____

* The required value will be calculated for each channel based on the measured return loss of the antenna. Use the following two equations to calculate the maximum required value:

Pass = P, Fail = F

Given $\overline{a_i}$ and $\overline{a_j}$ as antenna return loss measurements (from polar diagram)

and θ being the phase difference between $\overline{a_i}$ and $\overline{a_j}$, calculate return loss as:

$$b = \left(a_i^2 + a_j^2 - 2a_i a_j \cos\theta\right)^{1/2}$$

The maximum required value is equal to 1.2/b.

Part No.:_____ Test Engineer:_____

Serial No.:_____ Quality Assurance:_____

Date:_____

Y. Yamada 8/27/98 QC 229

TEST DATA SHEET 19

Survival Heater and Thermal Switch Test Data (Paragraph 3.6.3) (A1-1)

Test Setup Verified: T. Tsuyuki
Signature

Baseplate Temperature (T_B) 23.1 °C

	Open Switch		Closed Switch		
Reference Designation	>10 MΩ	Pass/Fail	Specification	Measured Value	Pass/Fail
HR1/TS1	>50MΩ	P	25 - 35 Ω	32.3	P
	>50MΩ	P		32.2	P
HR2/TS2	>50MΩ	P		31.9	P
	>50MΩ	P		31.2	P

Pass = P, Fail = F

Part No.: 1356429-1

Serial No.: F02

Test Engineer: [signature]

Quality Assurance: [signature] 7A 267 AUG 28 '98

Date: 8/11/98

Y. Yuki 3/27/98 QC 229

TEST DATA SHEET 19

PLO Lock Detection Terminals Test Data (Paragraph 3.6.2)

Test Setup Verified: T. Yung (Signature) Baseplate Temperature (T_B) 23.1 °C

FOR REFERENCE ONLY

Reference Designation	Specification	Measured Value	Pass/Fail
A65	~~0.07 – 1.08 MΩ~~ 70.0 – 85.0 KΩ	77.8 KΩ	P
A66	~~0.07 – 1.08 MΩ~~ 70.0 – 85.0 KΩ	77.7 KΩ	P

Pass = P, Fail = F

N/A

Part No.: 1356429 - 1

Serial No.: F02

Test Engineer: [signature]

Quality Assurance: _____

Date: 8/12/98

Y. Trujillo 8/27/98 (QC 229)

TEST DATA SHEET 22 (Sheet 1 of 3)

Bias Voltage Verification Test Data (Paragraph 3.6.4) (A1-1)

Test Setup Verified: J. James Signature

Baseplate Temperature (T_B) 24.2 °C

Reference Designation	Specification	Measured Value (V)	Pass/Fail
Mixer/IF AMP Ch 6, 7, 15, 9-14	+10 ±0.1	9.93 V	P
DRO Ch 7	+10 ±0.1	9.92 V	P
DRO Ch 15	+15 ±0.15	14.87 V	P
PLO +15	+15 ±0.15	15.07 V	P
PLO -15	-15 ±0.15	-15.10 V	P
IF AMP Ch 9-14	+8 ±0.08	7.93 V	P
DRO CH6	+10 ± 0.1	9.98 V	P

Part No.: 1356429-1

Serial No.: F02

Test Engineer: [signature]

Quality Assurance: [signature] (TA 267) AUG 28 '98

Date: 8/12/98

Y. Yuh 8/29/98 QC 229

TEST DATA SHEET 23 (Sheet 2 of 3)
Bias Voltage Verification Test Data (Paragraph 3.6.4) (A1-2)

Test Setup Verified:_____ Baseplate Temperature (T_b) _____°C
Signature

Reference Designation	Specification	Measured Value (V)	Pass/Fail
Mixer/IF AMP Ch 3, 4, 5, 8	+10 ±0.1		
DRO Ch 5	+10 ±0.1		
DRO Ch 4	+10 ±0.1		
DRO Ch 3	+10 ±0.1		
DRO Ch 8	+10 ±0.1		

Part No.:_____ Test Engineer:_____

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Date:_____

NASA
National Aeronautics and Space Administration

Report Documentation Page

1. Report No.	2. Government Accession No.	3. Recipient's Catalog No.
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4. Title and Subtitle	5. Report Date
Integrated Advanced Microwave Sounding Unit-A (AMSU-A), Performance Verification Report	September 1998
	6. Performing Organization Code: ---
7. Author(s): R. Kapper	8. Performing Organization Report No.: 11231
	10. Work Unit No.: ---
9. Performing Organization Name and Address: Aerojet, 1100 W. Hollyvale, Azusa, CA 91702	11. Contract or Grant No.: NAS 5-32314
12. Sponsoring Agency Name and Address: NASA, Goddard Space Flight Center, Greenbelt, Maryland 20771	13. Type of Report and Period Covered: Final
	14. Sponsoring Agency Code: ---

15. Supplementary Notes: ---

16. ABSTRACT (*Maximum 200 words*)

This is the Performance Verification Report, METSAT AMSU-A1 Receiver Assembly, P/Ns 1356409-1 & 1356429-1, S/N 105, for the Integrated Advanced Microwave Sounding Unit-A (AMSU-A).

17. Key Words (Suggested by Author(s))	18. Distribution Statement
EOS Microwave System	Unclassified --- Unlimited

19. Security Classif. (of this report)	20. Security Classif. (of this page)	21. No. of pages	22. Price
Unclassified	Unclassified		---

NASA FORM 1626 OCT 86

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4. TITLE AND SUBTITLE
Integrated Advanced Microwave Sounding Unit-A (AMSU-A), Performance Verification Report

5. FUNDING NUMBERS
NAS 5-32314

6. AUTHOR(S)
R. Kapper

7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES)
Aerojet
1100 W. Hollyvale
Azusa, CA 91702

8. PERFORMING ORGANIZATION REPORT NUMBER
11231
September 1998

9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)
NASA
Goddard Space Flight Center
Greenbelt, Maryland 20771

10. SPONSORING/MONITORING AGENCY REPORT NUMBER
---

11. SUPPLEMENTARY NOTES

12a. DISTRIBUTION/AVAILABILITY STATEMENT

12b. DISTRIBUTION CODE
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13. ABSTRACT (*Maximum 200 words*)

This is the Performance Verification Report, METSAT AMSU-A1 Receiver Assembly P/Ns 1356409-1 & 1356429-1, S/N 105, for the Integrated Advanced Microwave Sounding Unit-A (AMSU-A).

14. SUBJECT TERMS
EOS
Microwave System

15. NUMBER OF PAGES

16. PRICE CODE
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17. SECURITY CLASSIFICATION OF REPORT	18. SECURITY CLASSIFICATION OF THIS PAGE	19. SECURITY CLASSIFICATION OF ABSTRACT	20. LIMITATION OF ABSTRACT
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Performance Verification Report METSAT AMSU-A1 Receiver Assembly, P/Ns 1356409-1 & 1356429-1, S/N 105	Report 11231 September 1998

INPUT FROM: DATE	CDRL:	SPECIFICATION ENGINEER: DATE
R. Kapper	207	

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APPROVED SIGNATURES	DEPT. NO.	DATE
Product Team Leader (R. Kapper) R. Kapper	8661	9/30/98
Systems Engineer (R. Platt) R. H. Platt	8311	10/7/98
Design Assurance (E. Lorenz) E. Lorenz	8331	10/1/98
Quality Assurance (R. Taylor) R M Taylor	7831	10-1-98
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1. AGENCY USE ONLY *(Leave blank)*

2. REPORT DATE
September 1998

3. REPORT TYPE AND DATES COVERED
Contractor Report

4. TITLE AND SUBTITLE
Integrated Advanced Microwave Sounding Unit-A (AMSU-A) Performance Verification Report, METSAT AMSU-A1 Receiver Assembly P/Ns 1356409-1 & 1356429-1, S/N 105

5. FUNDING NUMBERS
NAS5-32314

6. AUTHOR(S)
None listed.

7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS (ES)

Aerojet
1100 W. Hollyvale St.
Azusa, CA 91702

8. PEFORMING ORGANIZATION REPORT NUMBER

CDRL 208
Report 11231

9. SPONSORING / MONITORING AGENCY NAME(S) AND ADDRESS (ES)

National Aeronautics and Space Administration
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10. SPONSORING / MONITORING AGENCY REPORT NUMBER

CR–208630

11. SUPPLEMENTARY NOTES

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12b. DISTRIBUTION CODE

13. ABSTRACT *(Maximum 200 words)*

This test report presents the test data of the METSAT AMSU-A1 Flight Model No. 2 (FM-2) receiver subsystem. The tests are performed per the Acceptance Test Procedure (ATP) for the AMSU-A Receiver Subsystem, AE-26002/6A.

14. SUBJECT TERMS
Advanced Microwave Sounding Unit-A (AMSU-A); METSAT; receiver assembly.

15. NUMBER OF PAGES

16. PRICE CODE

17. SECURITY CLASSIFICATION OF REPORT	18. SECURITY CLASSIFICATION OF THIS PAGE	19. SECURITY CLASSIFICATION OF ABSTRACT	20. LIMITATION OF ABSTRACT
Unclassified	Unclassified	Unclassified	UL